**VOLUME II**

# VILLA SERENA SPECIFIC PLAN PROJECT
# RECIRCULATED DRAFT
# ENVIRONMENTAL IMPACT REPORT APPENDICES

**STATE CLEARINGHOUSE NO. 2022020150**

**UPLAND, CALIFORNIA**

LSA

October 2024

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# RECIRCULATED DRAFT
# ENVIRONMENTAL IMPACT REPORT APPENDICES

**STATE CLEARINGHOUSE NO. 2022020150**

**UPLAND, CALIFORNIA**

Submitted to:

Joshua Winter, Senior Planner
City of Upland
Development Services Department/Planning Division
460 N. Euclid Avenue
Upland, CA 91786

Prepared by:

LSA
157 Park Place
Pt. Richmond, California 94801
510.236.6810

Project No. TCI2201

LSA

October 2024

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# APPENDIX A-1

# NOTICE OF PREPARATION

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# Notice of Preparation

**To:** Interested Agencies/Organizations

(Address)

**From:** City of Upland
460 N. Euclid Avenue
Upland, CA 91786
(Address)

**Subject: Notice of Preparation of a Draft Environmental Impact Report**

The City of Upland will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study ( ☐ is ☒ is not ) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Joshua Winter, Associate Planner at the address shown above. We will need the name for a contact person in your agency.

**Project Title:** Villa Serena Specific Plan (Tract No. 20245)

**Project Applicant, if any:** The Colonies Partners, L.P., a California limited partnership

Date February 8, 2022

Signature

Title Associate Planner

Telephone (909) 931-4143

**Reference:** California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

# CITY OF UPLAND
# NOTICE OF PREPARATION
# of a DRAFT ENVIRONMENTAL IMPACT REPORT
# for the VILLA SERENA SPECIFIC PLAN

| | |
|---|---|
| **Date:** | February 8, 2022 |
| **Subject:** | Notice of Preparation (NOP) for the Villa Serena Specific Plan Draft Environmental Impact Report |
| **To:** | State Clearinghouse, State Responsible Agencies, State Trustee Agencies, Other Public Agencies, Interested Organizations |
| **Lead Agency/Sponsor:** | City of Upland, Planning Division |
| **Project Title:** | Villa Serena Specific Plan |

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**NOTICE IS HEREBY GIVEN** that the City of Upland will prepare an environmental impact report (EIR) for the Villa Serena Specific Plan. The City is the lead agency for the project. The purpose of this notice is to (1) serve as a Notice of Preparation of an EIR pursuant to the California Environmental Quality Act (CEQA) Guidelines § 15082, (2) advise and solicit comments and suggestions regarding the scope and content of the EIR to be prepared for the project.

**NOTICE OF PREPARATION:** The City of Upland, as Lead Agency, requests that responsible and trustee agencies respond in a manner consistent with § 15082(b) of the CEQA Guidelines. Pursuant to CEQA § 21080.4, responsible agencies must submit any comments in response to this notice no later than 30 days after receipt. The public review period will commence on Tuesday, February 8, 2022, and will close on Wednesday, March 9, 2022 at 6:00 pm. A copy of the NOP will be available at the Upland Public Library, 450 North Euclid Avenue, Upland, CA 91786 during open hours or the Upland City Hall Bulletin Board and the Development Services Department/Planning Division Public Counter, located at Upland City Hall, 460 North Euclid Avenue, Upland, CA 91786, counter hours are Monday through Thursday from 8:00 AM to 6:00 PM., excluding holidays.

Copies of the NOP are also available for review on the City's website at https://www.uplandca.gov/environmental-review

**WRITTEN COMMENTS:** We ask that any person wishing to comment on the NOP provide written comments by the end of the public review period, Wednesday, March 9, 2022, at 6:00 pm, addressed to Joshua Winter, Associate Planner, City of Upland – Planning Division, at:

Email: jwinter@uplandca.gov

Or by mail to: Joshua Winter, City of Upland
Development Services Department, Planning Division
460 North Euclid Avenue
Upland, CA 91786

**PROJECT LOCATION:** The Project Site constitutes a 9.2-acre portion of the existing 15th Street flood control detention basin located North of E. 15th Street, South of the Upland Hills Golf Course, East of Campus Avenue and West of Grove Avenue. The project site is further described as Assessor's Parcel Numbers 1045-121-04 and 1045-151-35.

**EXISTING CONDITONS:** The Project Site constitutes a portion of the existing 15th Street flood control detention basin which is bounded by residential uses and the Upland Hills Country Club on the north, and single-family residential uses on the east, west, and south (Figure 1 – Vicinity Map). The City has determined the 9.2-acre portion of the flood control detention basin comprising the Site to be a surplus parcel. The remaining 11.1 acres of the flood control detention basin as adequate for continued flood control operations pursuant to completion of modifications to portions of the basin made as part of the Project.

**PROJECT DESCRIPTION:** The project involves the establishment of a Residential Specific Plan for the development a gated residential community that consists of 65 single-family detached residential units at a density of 7.1 dwelling units per acre and on-site active and passive recreational amenities to be provided within the common area open space on an existing 9.2-acre portion of the 15th street flood control detention basin. The Project includes modifications (including relocation of existing basin infrastructure) to the existing basin to accommodate the residential Site and maintain a fully operational flood control and retention facility on the remaining 11.1 acres of the basin area.

**POTENTIAL SIGNIFICANT EFFECTS:** As authorized by the State CEQA Guidelines, based on preliminary review, the City determined that it would prepare an EIR for the proposed project, and therefore, it is beginning work directly on the EIR process and will focus on potentially significant effects of the proposed project in that EIR, while briefly indicating the reasons that other effects will not be potentially significant. An Initial Study is not required to determine that an EIR will be prepared and is therefore not attached. The City EIR will discuss potential environmental impacts of the proposed project, including potential pre-construction, construction, and operations impacts. The EIR will analyze potential environmental effects of the project, including: Air Quality, Cultural Resources, Greenhouse Gas Emissions, Land Use and Planning, Population and Housing, Noise, Transportation, and Tribal Cultural Resources. The project site is not on a list compiled pursuant to Government Code section 65962.5.

Figure 1 – Vicinity Map



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# APPENDIX A-2

# NOP COMMENT LETTERS

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# Bill Rodstrom Public Comments for the Villa Serena NOP

March 9, 2022

To Joshua Winter, Associate Planner, City of Upland
From Bill Rodstrom, former U.S. Fish & Wildlife Service biologist

Dear Mr. Winter,
I'll start off with a comment regarding my earlier letter
Response to Joshua Winter's comments regarding my letter of November 17, 2019
Responses to Public Comments for the Initial Study/Mitigated Negative Declaration
**General Response:**
"It should also be noted Mr. Rodstrom's career since the late 1980's has been based in inner northern California per his public profile. This species is found mainly in the coastal plains of southern California."

Actually, I grew up in East San Diego and La Mesa in habitat similar to Upland, and after moving to coastal Northern California in 1971, I visited my parents in La Mesa and birded in Coastal San Diego County one of more times a year between 1971 and 2011 (40 years) until my last parent died, including participating in Christmas Bird Counts in Oceanside and coastal Santa Barbara County. I worked for U.C. Irvine for several years and birded in that vicinity, so I am familiar with Southern California birds. I also visited my father-in-law several times a year between 2000 and 2021, who lived near Grove and 15th Street, and would explore the 15th street flood control basin one or more times when I visited him, over 20 years.
I have also participated in Christmas bird counts nearly every year since 1975, including 2021, often birding with prominent birdwatchers such as Gary Lester. I also have been participating in nearly annual birdathons, (I missed the 2021 birdathon to avoid catching Covid-19) usually in the first week of May to see as many species of birds as possible in a 24-hour period. Our four-person teams usually see over 130 species of birds in one 24-hour period, teams that include very expert California birders such as Gary Friedrichsen and Ken Burton. While I'm no expert on birds, I am a very experienced birder, having seen roughly 600 species of North American birds.
I have also posted nearly 1,400 natural history observations using the iNaturalist program https://www.inaturalist.org/observations/billrod9 Most of these observations from the proposed Villa Serena project site were confirmed by experts in those fields.

My comments will focus on threatened species, flood control capacity, nature deficit disorder, wetlands, and mitigation issues
**Threatened Species**
I was shocked to see that the whole project area had been bulldozed flat in May 2020. Was this legal? The Colonies Partners had removed all of the best coastal sage scrub habitat favored by **California Gnatcatchers**. That's like applying for a permit to fill a wetland after filling it in and destroying it!
In my opinion, there was a small but suitable habitat for gnatcatchers, and I heard or saw gnatcatchers many times in the project area while walking along the south levee adjacent to 15th Street, roughly between Monte Vista Avenue and westward for several hundred yards. I am attaching before and after photos from June 2019 with healthy coastal sage scrub and June 2020 after the habitat destruction.
The bulldozed habitat should be allowed to grow back to see if gnatcatchers will return. Also, wetland habitats were destroyed or drastically altered by the bulldozing. Was this legal? **Least Bell's Vireos** may have been using the wetland areas, but much of their preferred habitat was also destroyed by the bulldozing.

Lastly, the bulldozed habitat should be allowed to return to see if **Burrowing Owls** will use the banks of the levees to nest.



Coastal Sage Scrub habitat at Upland Flood Control Basin, June 26, 2019



Coastal Sage Scrub habitat at Upland Flood Control Basin after being destroyed by bulldozers, June 23, 2020

**Flood Control Capacity**

Since approximately 2001 I have visited the proposed development site (a flood control basin) about 3-4 times a year, visiting an elderly relative who lived at the nearby Red Hill Country Club. I have also seen high rainfall events such as Feb. 14, 2019, when the flood control basin was able to store stormwater runoff as it was designed, to protect neighboring suburban homes from being flooded. See attached photos.

The proposed development would fill about half of the existing flood control basin, so my question is: will the remaining half to the east be expected to collect all of the stormwater runoff during high rainfall events? The hypothetical Flood Routing Analysis in the appendix is unclear to me on this issue. My Feb. 14, 2019 photos show the basin filling between 3-4 feet of stormwater at the west end of the proposed project. This storm generated approximately 2.1 inches of rain measured at the nearby Ontario Airport, according the U.S. Weather Service. A more severe or prolonged storm, or a much smaller basin would presumably fill the basin even higher.



Flood Control Basin looking west Feb. 14, 2019


Flood Control Basin looking east Feb. 14, 2019

**Nature Deficit Disorder**

"Some preliminary research shows that lack of time outdoors, does have negative effects on children's mental well-being"-Wikipedia. The 15th Street Flood Control Basin is the only wildland within a half a mile of thousands of nearby residents and their kids who can walk to this location. Otherwise, these residents will have to get in a car and drive several miles to get to some native habitat. I have observed many wild species of native plants, birds, reptiles, and many insects like native butterflies, bees, and dragonflies. There is very little biodiversity at city parks like the nearby Upland Memorial Park, which is full of non-native trees and lawns. These artificial urban parks offer some recreational activities, but are biological wastelands compared to a similar sized wildland. Kids and their parents need opportunities to explore nature and learn about local plants, animals and fungi.

**Wetlands**

In the Specific Plan Project Initial Study report, the geotechnical report stated that there was no surface water on the proposed development.

Also, for well over a decade there have been three small wetland ponds from year-round runoff from the Upland Hills Country Club golf course on the north boundary of the proposed development, with wetland species like Willows (Salix), cattails (Typha), watercress (Nasturtium), etc., and associated breeding dragonflies, mallards and other wetland-dependent species. I did not see these noted in the geotechnical report. Approximately 80% of bird species are associated with riparian or wetland habitat.

On September 5, 2019 and October 26, 2019, I observed a four-foot-wide stream of water pouring through roughly 8 ft. diameter culverts on the west end of the proposed development. What is the source of this water? Is this what is left of the creek coming downstream from Frankish Canyon? Where will it be diverted to?

I have attached a list of species that I have observed in the Flood Control Basin, and this is in Excel format, so is not pasted into this document.

**Mitigation**

Because this project will remove over nine acres of Sage Scrub native habitat, I would urge that all tree, shrub, and perennial plant landscaping be composed of California native plants. Native insects and the birds and other wildlife that eat them or feed them to their young are not adapted to eating non-native plants, so the area becomes a biological desert for native animals when native habitat is replaced with nonnatives. For more on this subject I recommend that you read ***Bringing Nature Home: How You Can Sustain Wildlife with Native Plants***, by Douglas Tallamy, or view his PowerPoint presentation at least. Here's a link for that: YouTube Video link: ***Restoring Nature's Relationships*** https://www.youtube.com/watch?v=yo4ZJ-ryTaE
You can find more about using native plants for landscaping at the Calscape website: https://calscape.org/

I have made every effort to substantiate my observations.

I feel that the best use for the 15th Street Flood Control Basin is to allow it to grow back as an important bit of southern coastal sage scrub rather than to develop into yet another development.

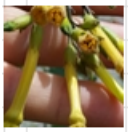
Sincerely,

Bill Rodstrom, former U.S. Fish & Wildlife Service biologist
707 498-4762
Bill.rodstrom@gmail.com

| | | | |
|---|---|---|---|
|  | *Acmispon glaber* | Deerweed | April 26, 2017 |
| | | | June 10, 2017 |
|  | *Albizia julibrissin* | Persian Silk Tree | June 10, 2017 |
|  | *Astragalus pomonensis* | Pomona Milkvetch | February 13, 2018 |
|  | *Brassica rapa* | Field Mustard | February 11, 2018 |
|  | Genus *Camissoniopsis* | Suncups | February 12, 2019 |
|  | *Cucurbita foetidissima* | Buffalo Gourd | August 18, 2017 |
| | | | May 28, 2018 |
| | | | May 29, 2021 |
|  | *Datura wrightii* | Sacred Datura | July 25, 2017 |
| | | | May 30, 2018 |

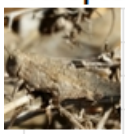
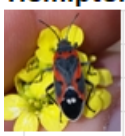
| | | | |
|---|---|---|---|
|  | *Eriodictyon trichocalyx* | Hairy Yerba Santa | April 26, 2017 |
| | | | May 26, 2018 |
|  | | | June 26, 2019 |
| | *Eriogonum fasciculatum* | California Buckwheat | February 14, 2018 |
| | The dominant shrub in the flood control basin | | May 26, 2018 |
|  | *Erythranthe guttata* | Seep Monkey Flower | May 30, 2018 |
| | Occurs in wetlands, and wetland/riparian communities | | |
|  | *Fraxinus velutina* | Velvet Ash | May 29, 2021 |
| | Occurs in wetlands and wetland/riparian communities | | May 30, 2018 |
|  | *Heterotheca grandiflora* | Telegraphweed | February 11, 2018 |
|  | *Lepidospartum squamatum* | California Broomsage | July 23, 2017 |
|  | *Ludwigia peploides* | Floating Primrose-Willow | June 10, 2017 |
| | Occurs in wetlands and riparian communities | | May 28, 2021 |

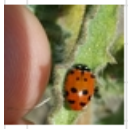
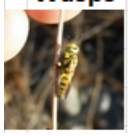
| | | | |
|---|---|---|---|
|  | *Eriodictyon trichocalyx* | Hairy Yerba Santa | April 26, 2017 |
| | | | May 26, 2018 |
|  | | | June 26, 2019 |
| | *Eriogonum fasciculatum* | California Buckwheat | February 14, 2018 |
| | The dominant shrub in the flood control basin | | May 26, 2018 |
|  | *Erythranthe guttata* | Seep Monkey Flower | May 30, 2018 |
| | Occurs in wetlands, and wetland/riparian communities | | |
|  | *Fraxinus velutina* | Velvet Ash | May 29, 2021 |
| | Occurs in wetlands and wetland/riparian communities | | May 30, 2018 |
|  | *Heterotheca grandiflora* | Telegraphweed | February 11, 2018 |
|  | *Lepidospartum squamatum* | California Broomsage | July 23, 2017 |
|  | *Ludwigia peploides* | Floating Primrose-Willow | June 10, 2017 |
| | Occurs in wetlands and riparian communities | | May 28, 2021 |

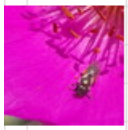
| | | | |
|---|---|---|---|
|  | *Nasturtium officinale* | Watercress | May 28, 2021 |
| | Occurs in wetlands and riparian communities | | |
|  | *Nicotiana glauca* | Tree Tobacco | June 10, 2017 |
|  | *Opuntia × vaseyi* | Vasey's Prickly Pear | April 26, 2017 |
| | | | July 23, 2017 |
|  | *Penstemon spectabilis* | Showy Penstemon | February 11, 2018 |
| | | | May 26, 2018 |
| | | | May 29, 2021 |
|  | *Persicaria maculosa* | Lady's Thumb | May 29, 2021 |
| | Usually occurs in wetlands and disturbed areas | | May 30, 2018 |
|  | *Platanus racemosa* | Western Sycamore | May 29, 2021 |
| | Occurs on streambanks and riparian communities | | February 13, 2018 |
| | | | May 30, 2018 |
|  | *Prunus ilicifolia* | Hollyleaf Cherry | May 26, 2018 |
|  | *Pseudognaphalium californicum* | California Cudweed | April 29, 2017 |

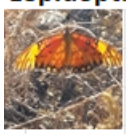
| | | | |
|---|---|---|---|
|  | *Ricinus communis* | Castor Bean | June 10, 2017 |
|  | *Rhus aromatica* | Fragrant Sumac | *April 26, 2017* |
|  | Salvia mellifera | Black Sage | June 10, 2017 |
|  | *Solanum douglasii* | Greenspot Nightshade | February 13, 2018 |
|  | Genus *Typha* | Cattails | May 29, 2021 |
| | Occurs in wetlands and freshwater marshes | | |
|  | *Verbesina encelioides* | Cowpen Daisy | July 22, 2017 |
| | Occurs in disturbed areas and wetland/riparian communities | | May 26, 2018 |
| | | | November 6, 2018 |
| | | | November 6, 2020 |
| **Invertebrates** | | | |
| **Insects** | | | |
| **Odonata - Damselflies & Dragonflies** | | | |
|  | Odonata need standing fresh water to breed | | August 14, 2018 |
| | *Enallagma civile* | Familiar Bluet | June 10, 2017 |
| | | | July 25, 2017 |
| | I observed female dragonflies laying eggs on aquatic vegetation | | |

| | | | |
|---|---|---|---|
|  | *Enallagma praevarum* | Arroyo Bluet | May 30, 2018 |
|  | Erythemis collocata | Western Pondhawk | August 14, 2018 |
|  | *Libellula croceipennis* | Neon Skimmer | July 23, 2017 |
|  | *Libellula saturata* | Flame Skimmer | July 25, 2017<br>August 14, 2018<br>November 6, 2020 |
|  | *Pachydiplax longipennis* | Blue Dasher | July 25, 2017 |
|  | *Perithemis intensa* | Mexican Amberwing | August 16, 2017<br>June 26, 2019 |
|  | *Rhionaeschna multicolor* | Blue-eyed Darner | June 10, 2017 |

| | | | |
|---|---|---|---|
|  | *Sympetrum illotum* | Cardinal Meadowhawk | June 10, 2017<br>October 26, 2019 |
| | *Anaz junius* | Common Green Darner | |
| | (Seen several times but not photographed) | | |
| **Orthoptera - Grasshoppers** | | | |
|  | *Lactista gibbosus* | Trailside Grasshopper | August 18, 2017 |
| **Mantids** | | | |
|  | *Stagmomantis limbata* | Arizona Mantis | November 16, 201 |
| **Hemiptera - True Bugs** | | | |
|  | *Lygaeus kalmii* | Small Milkweed Bug | April 27, 2017 |
| **Diptera - Flies** | | | |
|  | *Eristalis stipator* | Yellow-shouldered Drone Fly | February 14, 2018 |
|  | *Copestylum mexicanum* | Mexican Cactus Fly | October 26, 2019 |

| | | | |
|---|---|---|---|
|  | *Hemipenthes sinuosa* | Sinuous Bee Fly | June 24, 2020 |
|  | *Toxomerus marginatus* | Margined Calligrapher | November 16, 2019 |
| **Coleoptera - Beetles** | | | |
|  | *Coccinella septempunctata* | Seven-spotted Lady Beetle | April 29, 2017 |
|  | *Hippodamia convergens* | Convergent Lady Beetle | February 11, 2018 |
| **Hymenoptera - Ants, Bees & Wasps** | | | |
| **Ants** | | | |
|  | Genus *Pogonomyrmex* | Harvester Ants | May 29, 2021 |
| **Wasps** | | | |
|  | *Philanthus sp.* | Beewolves | August 16, 2017<br>September 5, 2019 |

| Bees | | | |
|---|---|---|---|
|  | Anthophora urbana | Urbane Digger Bee | October 26, 2019 |
|  | *Apis mellifera* | Western Honey Bee | February 12, 2019<br>February 11, 2018<br>June 10, 2017 |
|  | Subgenus Chelostomoides | Nearctic Resin Bees | September 5, 2019 |
|  | Genus *Colletes* | Cellophane Bees | November 6, 2018 |
|  | Subgenus Dialictus | Metallic Sweat Bees | May 29, 2021 |
|  | Subgenus Eumelissodes | Summer Long-horned Bee | June 23, 2020 |
|  | *Halictus ligatus* | Ligated Furrow Bee | September 5, 2019 |

| | | | |
|---|---|---|---|
|  | *Lasioglossum sisymbrii* | Tansymustard Sweat Bee | May 29, 2021 |
|  | *Peponapis pruinosa* | Pruinose Squash Bee | May 28, 2018 |
|  | Xenoglossa strenua | Nimble Squash Bee | May 29, 2021 |
|  | *Xylocopa sonorina* | Valley Carpenter Bee | November 17, 2019 |
| **Lepidoptra - Butterflies & Moths** | | | |
|  | *Agraulis vanillae* | Gulf Fritillary | August 16, 2017 |
|  | *Danaus gilippus* | Queen | April 27, 2017 |
| No Photo | *Danaus plexippus* | Monarch | May 28, 2021 |

| | | | |
|---|---|---|---|
|  | *Heliopetes ericetorum* | Northern White-Skipper | September 5, 2019 |
|  | *Hylephila phyleus* | Fiery Skipper | July 22, 2017<br>August 17, 2017<br>February 11, 2018<br>September 5, 2019 |
|  | *Junonia coenia* | Common Buckeye | April 27, 2017<br>November 6, 2018 |
|  | *Leptotes marina* | Marine Blue | August 15, 2018<br>June 26, 2019<br>September 5, 2019<br>November 6, 2020 |
|  | *Phoebis agarithe* | Large Orange Sulphur | July 25, 2017 |
|  | *Pontia protodice* | Checkered White | July 22, 2017<br>September 5, 2019 |
|  | *Strymon melinus* | Gray Hairstreak | February 11, 2018 |
|  | *Vanessa cardui* | Painted Lady | August 16, 2017 |

## Vertebrates

### Birds

| | | |
|---|---|---|
|  | *Anas platyrhynchos* | Mallard | February 12, 2019 |
| | Breeding season pair taking off from a permanent pond | | |
|  | *Spinus psaltria* | Lesser Goldfinch | June 10, 2017 |
|  | *Zenaida macroura* | Mourning Dove | May 26, 2018 |
| | *Miscellaneous bird observations* | | No Specific Dates |
| | *Tyrannus spp.* | Western or Cassin's Kingbirds | |
| | *Aphelocoma californica* | California Scrub Jay | |
| | *Cathartes aura* | Turkey Vulture | |
| | *Zonotrichia leucophrys* | White-crowned Sparrow | |
| | *Icterus spp.* | Hooded or Bullock's Oriole | |
| | *Accipiter cooperii* | Cooper's Hawk | |
| | *Buteo jamaicencis* | Red-tailed Hawk | |
| | *Haemorhous mexicanus* | House Finch | |
| | *Branta canadensis* | Canada Goose | |
| | *Mimus polyglottos* | Northern Mockingbird | |
| | *Polioptila spp.* | Gnatcatchers | |

## Amphibians and Reptiles

| | | | |
|---|---|---|---|
|  | *Sceloporus occidentalis* ssp. *longipes* | Great Basin Fence Lizard | April 26, 2017<br>July 25, 2017 |
|  | *Uta stansburiana* ssp. *elegans* | Side-blotched Lizard | July 25, 2017 |

## Mammals

| | | | |
|---|---|---|---|
|  | *Canis latrans* | Coyote | April 27, 2017 |
| A pack of Coyotes lived in the flood control basin before bulldozing | | | |
|  | | Dead Coyote pup<br>(after the bulldozing) | June 23, 2020 |
|  | *Sciurus niger* | Fox Squirrel | February 14, 2018<br>September 5, 2019 |
|  | *Sylvilagus audubonii* | Desert Cottontail | May 29, 2021 |
| | | Ground Squirrel | No dates |
| | | Bobcat scat | 2021 |

All observations were within 100 ft. of the project boundary. Nearly all were within the boundary.

**Contact information: Bill Rodstrom, P.O. Box 4684, Arcata CA 95518**
bill.rodstrom@gmail.com **Phone: (707) 498-4762**

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

***GAVIN NEWSOM, Governor***
***CHARLTON H. BONHAM, Director***

March 7, 2022

Mr. Joshua Winter
Associate Planner
City of Upland
460 North Euclid Avenue
Upland, CA 91786

Subject: Notice of Preparation of a Draft Environmental Impact Report
Villa Serena Specific Plan Project (Tract No. 20245)
State Clearinghouse No. 2022020150

Dear Mr. Winter:

The California Department of Fish and Wildlife (CDFW) received a Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) from the City of Upland (City) for the Villa Serena Specific Plan Project (Project) pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

**CDFW ROLE**

CDFW is California's Trustee Agency for fish and wildlife resources, and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

1 CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

## PROJECT DESCRIPTION SUMMARY

The proposed Project includes a general plan amendment, specific plan, site plan, rezone, and land division on Assessor Parcel Number (APN) 1045-121-04 and 1045-151-35, an approximate 9.2-acre portion of the existing 15th Street flood control detention basin, located north of E. 15th Street, south of the Upland Hills Golf Course, east of Campus Avenue, and west of Grove Avenue, in the City of Upland, San Bernardino County, California. Specific details of the proposed Project include:

1. The Villa Serena Specific Plan (Tract No. 20245) for the following:
    - Establish a 9.2-acre portion of the existing 15th Street flood control detention basin for a gated residential community consisting of 65 single-family detached residential units at a density of 7.1 dwelling units per acre;
    - Designate a portion of the 9.2-acre residential community as Open Space;
    - Modify and relocate existing basin infrastructure in the 9.2-acre portion of flood control detention basin to accommodate the residential site.

2. Zone Change to the City of Upland Zoning Map to correspond to the proposed changes on the Land Use Map, as noted above. The zoning classification for the proposed 9.2 acres of residential development is Single-Family Residential, at a density of 7.1 dwelling units per acre.

## COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist the City in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.

CDFW recommends that the forthcoming DEIR address the following:

### Assessment of Biological Resources

Section 15125(c) of the CEQA Guidelines states that knowledge of the regional setting of a project is critical to the assessment of environmental impacts and that special

emphasis should be placed on environmental resources that are rare or unique to the region. To enable CDFW staff to adequately review and comment on the project, the DEIR should include a complete assessment of the flora and fauna within and adjacent to the Project footprint, with particular emphasis on identifying rare, threatened, endangered, and other sensitive species and their associated habitats.

The CDFW recommends that the DEIR specifically include:

1. An assessment of the various habitat types located within the project footprint, and a map that identifies the location of each habitat type. CDFW recommends that floristic, alliance- and/or association based mapping and assessment be completed following *The Manual of California Vegetation*, second edition (Sawyer et al. 2009). Adjoining habitat areas should also be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

2. A general biological inventory of the fish, amphibian, reptile, bird, and mammal species that are present or have the potential to be present within each habitat type onsite and within adjacent areas that could be affected by the project. CDFW's California Natural Diversity Database (CNDDB) in Sacramento should be contacted at (916) 322-2493 or CNDDB@wildlife.ca.gov to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code, in the vicinity of the proposed Project.

   Please note that CDFW's CNDDB is not exhaustive in terms of the data it houses, nor is it an absence database. CDFW recommends that it be used as a starting point in gathering information about the *potential presence* of species within the general area of the project site.

3. A complete, *recent* inventory of rare, threatened, endangered, and other sensitive species located within the Project footprint and within offsite areas with the potential to be affected, including California Species of Special Concern (CSSC) and California Fully Protected Species (Fish and Game Code § 3511). Species to be addressed should include all those which meet the CEQA definition (CEQA Guidelines § 15380). The inventory should address seasonal variations in use of the Project area and should not be limited to resident species. Focused species-specific surveys, completed by a qualified biologist and conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with CDFW and the U.S. Fish and Wildlife Service, where necessary. Note that CDFW generally considers biological field assessments for wildlife to be valid for a one-year period, and assessments for rare plants may be considered valid for a period of up to three years. Some aspects of the proposed Project may warrant

periodic updated surveys for certain sensitive taxa, particularly if the Project is proposed to occur over a protracted time frame, or in phases, or if surveys are completed during periods of drought.

Burrowing Owl (*Athene cunicularia*)

The Project site has the potential to provide suitable foraging and/or nesting habitat for burrowing owl. Take of individual burrowing owls and their nests is defined by Fish and Game Code section 86, and prohibited by sections 3503, 3503.5 and 3513. Take is defined in Fish and Game Code section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

CDFW recommends that the City of Upland follow the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation* (Department of Fish and Game, March 2012); available for download from CDFW's website: https://www.wildlife.ca.gov/conservation/survey-protocols. The Staff Report on Burrowing Owl Mitigation, specifies three steps for project impact evaluations:

a. A habitat assessment;
b. Surveys; and
c. An impact assessment

As stated in the Staff Report on Burrowing Owl Mitigation, the three progressive steps are effective in evaluating whether a project will result in impacts to burrowing owls, and the information gained from the steps will inform any subsequent avoidance, minimization, and mitigation measures. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with Fish and Game Code sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project.

4. A thorough, recent, floristic-based assessment of special status plants and natural communities, following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see https://www.wildlife.ca.gov/Conservation/Plants).

5. Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]).

6. A full accounting of all open space and mitigation/conservation lands within and adjacent to the Project.

**Analysis of Direct, Indirect, and Cumulative Impacts to Biological Resources**

The DEIR should provide a thorough discussion of the direct, indirect, and cumulative impacts expected to adversely affect biological resources as a result of the Project. To ensure that Project impacts to biological resources are fully analyzed, the following information should be included in the DEIR:

1. A discussion of potential impacts from lighting, noise, human activity (e.g., recreation), defensible space, and wildlife-human interactions created by zoning of development projects or other project activities adjacent to natural areas, exotic and/or invasive species, and drainage. The latter subject should address Project-related changes on drainage patterns and water quality within, upstream, and downstream of the Project site, including: volume, velocity, and frequency of existing and post-Project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-Project fate of runoff from the Project site.

   With respect to defensible space: please ensure that the DEIR fully describes and identifies the location, acreage, and composition of defensible space *within* the proposed Project footprint. Please ensure that any graphics and descriptions of defensible space associated with this project comply with San Bernardino County Fire Department regulations/requirements. The City of Upland, through their planning processes, should be ensuring that defensible space is provided and accounted for *within proposed development areas*, and not transferred to adjacent open space or conservations lands.

2. A discussion of potential indirect Project impacts on biological resources, including resources in areas adjacent to the project footprint, such as nearby public lands (e.g. National Forests, State Parks, etc.), open space, adjacent natural habitats, riparian ecosystems, wildlife corridors, and any designated and/or proposed reserve or mitigation lands (e.g., preserved lands associated with a Natural Community Conservation Plan, or other conserved lands).

3. An evaluation of impacts to adjacent open space lands from both the construction of the Project and any long-term operational and maintenance needs.

4. A cumulative effects analysis developed as described under CEQA Guidelines section 15130. Please include all potential direct and indirect Project related impacts to riparian areas, wetlands, vernal pools, alluvial fan habitats, wildlife corridors or wildlife movement areas, aquatic habitats, sensitive species and other sensitive

habitats, open lands, open space, and adjacent natural habitats in the cumulative effects analysis. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

**Alternatives Analysis**

CDFW recommends the DEIR describe and analyze a range of reasonable alternatives to the Project that are potentially feasible, would "feasibly attain most of the basic objectives of the Project," and would avoid or substantially lessen any of the Project's significant effects (CEQA Guidelines § 15126.6[a]). The alternatives analysis should also evaluate a "no project" alternative (CEQA Guidelines § 15126.6[e]).

**Mitigation Measures for Project Impacts to Biological Resources**

The DEIR should identify mitigation measures and alternatives that are appropriate and adequate to avoid or minimize potential impacts, to the extent feasible. The City of Upland should assess all direct, indirect, and cumulative impacts that are expected to occur as a result of the implementation of the Project and its long-term operation and maintenance. When proposing measures to avoid, minimize, or mitigate impacts, CDFW recommends consideration of the following:

1. *Fully Protected Species*: Fully protected species may not be taken or possessed at any time. Project activities described in the DEIR should be designed to completely avoid any fully protected species that have the potential to be present within or adjacent to the Project area. CDFW also recommends that the DEIR fully analyze potential adverse impacts to fully protected species due to habitat modification, loss of foraging habitat, and/or interruption of migratory and breeding behaviors. CDFW recommends that the Lead Agency include in the analysis how appropriate avoidance, minimization, and mitigation measures will reduce indirect impacts to fully protected species.

2. *Sensitive Plant Communities*: CDFW considers sensitive plant communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3, and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer et al. 2009). The DEIR should include measures to fully avoid and otherwise protect sensitive plant communities from project-related direct and indirect impacts.

3. *California Species of Special Concern* (CSSC): CSSC status applies to animals generally not listed under the federal Endangered Species Act or the CESA, but which nonetheless are declining at a rate that could result in listing, or historically

occurred in low numbers and known threats to their persistence currently exist. CSSCs should be considered during the environmental review process. CSSC that have the potential or have been documented to occur within or adjacent to the project area, including, but not limited to: burrowing owl, , yellow warbler (*Setophaga petechia*), and yellow breasted chat (I*cteria virens*).

4. *Mitigation*: CDFW considers adverse project-related impacts to sensitive species and habitats to be significant to both local and regional ecosystems, and the DEIR should include mitigation measures for adverse project-related impacts to these resources. Mitigation measures should emphasize avoidance and reduction of project impacts. For unavoidable impacts, onsite habitat restoration and/or enhancement, and preservation should be evaluated and discussed in detail. Where habitat preservation is not available onsite, offsite land acquisition, management, and preservation should be evaluated and discussed in detail.

   The DEIR should include measures to perpetually protect the targeted habitat values within mitigation areas from direct and indirect adverse impacts in order to meet mitigation objectives to offset project-induced qualitative and quantitative losses of biological values. Specific issues that should be addressed include restrictions on access, proposed land dedications, long-term monitoring and management programs, control of illegal dumping, water pollution, increased human intrusion, etc.

   If sensitive species and/or their habitat may be impacted from the Project, CDFW recommends the inclusion of specific mitigation in the DEIR. CEQA Guidelines section 15126.4, subdivision (a)(1)(8) states that formulation of feasible mitigation measures should not be deferred until some future date. The Court of Appeal in *San Joaquin Raptor Rescue Center* v. *County* of *Merced* (2007) 149 Cal.App.4th 645 struck down mitigation measures which required formulating management plans developed in consultation with State and Federal wildlife agencies after Project approval. Courts have also repeatedly not supported conclusions that impacts are mitigable when essential studies, and therefore impact assessments, are incomplete *(Sundstrom* v. *County* of *Mendocino* (1988) 202 Cal. App. 3d. 296; *Gentry* v. *City* of *Murrieta (1995)* 36 Cal. App. 4th 1359; *Endangered Habitat League, Inc.* v. *County* of *Orange* (2005) 131 Cal. App. 4th 777).

   CDFW recommends that the DEIR specify mitigation that is roughly proportional to the level of impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). The mitigation should provide long-term conservation value for the suite of species and habitat being impacted by the Project. Furthermore, in order for mitigation measures to be effective, they need to be specific, enforceable, and feasible actions that will improve environmental conditions.

5. *Habitat Revegetation/Restoration Plans*: Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant restoration techniques. Plans should identify the assumptions used to develop the proposed restoration strategy. Each plan should include, at a minimum: (a) the location of restoration sites and assessment of appropriate reference sites; (b) the plant species to be used, sources of local propagules, container sizes, and seeding rates; (c) a schematic depicting the mitigation area; (d) a local seed and cuttings and planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity. Monitoring of restoration areas should extend across a sufficient time frame to ensure that the new habitat is established, self-sustaining, and capable of surviving drought.

   CDFW recommends that local onsite propagules from the Project area and nearby vicinity be collected and used for restoration purposes. Onsite seed collection should be initiated in the near future in order to accumulate sufficient propagule material for subsequent use in future years. Onsite vegetation mapping at the alliance and/or association level should be used to develop appropriate restoration goals and local plant palettes. Reference areas should be identified to help guide restoration efforts. Specific restoration plans should be developed for various project components as appropriate.

6. *Nesting Birds and Migratory Bird Treaty Act:* Please note that it is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: Fish and Game Code section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by the rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

   CDFW recommends that the DEIR include the results of avian surveys, as well as specific avoidance and minimization measures to ensure that impacts to nesting birds do not occur. Project-specific avoidance and minimization measures may include, but not be limited to: project phasing and timing, monitoring of project-

related noise (where applicable), sound walls, and buffers, where appropriate. The DEIR should also include specific avoidance and minimization measures that will be implemented should a nest be located within the project site. If pre-construction surveys are proposed in the DEIR, the CDFW recommends that they be required no more than three (3) days prior to vegetation clearing or ground disturbance activities, as instances of nesting could be missed if surveys are conducted sooner.

7. *Moving out of Harm's Way:* To avoid direct mortality, CDFW recommends that the lead agency condition the DEIR to require that a CDFW-approved qualified biologist be retained to be onsite prior to and during all ground- and habitat-disturbing activities to move out of harm's way special status species or other wildlife of low or limited mobility that would otherwise be injured or killed from project-related activities. Movement of wildlife out of harm's way should be limited to only those individuals that would otherwise by injured or killed, and individuals should be moved only as far a necessary to ensure their safety (i.e., CDFW does not recommend relocation to other areas). Furthermore, it should be noted that the temporary relocation of onsite wildlife does not constitute effective mitigation for the purposes of offsetting project impacts associated with habitat loss.

8. *Translocation of Species*: CDFW generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species as studies have shown that these efforts are experimental in nature and largely unsuccessful.

**California Endangered Species Act**

CDFW is responsible for ensuring appropriate conservation of fish and wildlife resources including threatened, endangered, and/or candidate plant and animal species, pursuant to CESA. CDFW recommends that a CESA Incidental Take Permit (ITP) be obtained if the Project has the potential to result in "take" (California Fish and Game Code Section 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of State-listed CESA species, either through construction or over the life of the project. CESA ITPs are issued to conserve, protect, enhance, and restore State-listed CESA species and their habitats.

CDFW encourages early consultation, as significant modification to the proposed Project and avoidance, minimization, and mitigation measures may be necessary to obtain a CESA ITP. The California Fish and Game Code requires that CDFW comply with CEQA for issuance of a CESA ITP. CDFW therefore recommends that the DEIR addresses all Project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of CESA.

Based on review of CNDDB, and/or knowledge of the project site/vicinity/general area, CDFW is aware that the following CESA-listed species have the potential to occur onsite/have previously been reported onsite: Least Bell's vireo (*Vireo bellii pusillus*).

**Lake and Streambed Alteration Program**

The Project applicant has notified CDFW per Fish and Game Code section 1602. Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may do one or more of the following: Substantially divert or obstruct the natural flow of any river, stream or lake; Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or Deposit debris, waste or other materials that could pass into any river, stream or lake. Please note that "any river, stream or lake" includes those that are episodic (i.e., those that are dry for periods of time) as well as those that are perennial (i.e., those that flow year-round). This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

Upon receipt of a complete notification, CDFW determines if the proposed Project activities may substantially adversely affect existing fish and wildlife resources and whether a Lake and Streambed Alteration (LSA) Agreement is required. An LSA Agreement includes measures necessary to protect existing fish and wildlife resources. CDFW may suggest ways to modify your Project that would eliminate or reduce harmful impacts to fish and wildlife resources.

CDFW's issuance of an LSA Agreement is a "project" subject to CEQA (see Pub. Resources Code 21065). To facilitate issuance of the LSA Agreement, the DEIR should fully identify the potential impacts to the lake, stream, or riparian resources, and provide adequate avoidance, mitigation, and monitoring and reporting commitments.

**ADDITIONAL COMMENTS AND RECOMMENDATIONS**

To ameliorate the water demands of this Project, CDFW recommends incorporation of water-wise concepts in project landscape design plans. In particular, CDFW recommends xeriscaping with locally native California species, and installing water-efficient and targeted irrigation systems (such as drip irrigation). Local water agencies/districts, and resource conservation districts in your area may be able to provide information on plant nurseries that carry locally native species, and some facilities display drought-tolerant locally native species demonstration gardens (for example the Riverside-Corona Resource Conservation District in Riverside). Information on drought-tolerant landscaping and water-efficient irrigation systems is available on California's Save our Water website: http://saveourwater.com/what-you-can-do/tips/landscaping/

## ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). Information can be submitted online or via completion of the CNDDB field survey form at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

## FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.).

## CONCLUSION

CDFW appreciates the opportunity to comment on the NOP of a DEIR for the Villa Serena Specific Plan Project (SCH No. 2022020150) and recommends that the City of Upland address the CDFW's comments and concerns in the forthcoming DEIR. If you should have any questions pertaining to the comments provided in this letter, please contact Kim Freeburn, Senior Environmental Scientist Supervisor, at (909) 544-1344 or at Kim.Freeburn@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Scott Wilson
8091B1A9242F49C...

Scott Wilson
Environmental Program Manager

ec: Kim Freeburn, Senior Environmental Scientist, Supervisor
Inland Deserts Region
kim.freeburn@wildlife.ca.gov

HCPB CEQA Coordinator
Habitat Conservation Planning Branch

Office of Planning and Research, State Clearinghouse, Sacramento
state.clearinghouse@opr.ca.gov

## REFERENCES

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California Vegetation, 2nd ed. California Native Plant Society Press, Sacramento, California. http://vegetation.cnps.org/

**From:** Beanz Galvez
**To:** Joshua Winter; Janice Elliott
**Subject:** Re: Villa Sirena NOP
**Date:** Wednesday, March 9, 2022 5:42:41 PM
**Attachments:** Capture+ 2021-06-23-22-54-32.png
Capture+ 2021-05-14-14-22-56.png
Capture+ 2021-06-23-22-54-10.png
Capture+ 2021-06-28-16-10-43.png

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**WARNING: External email. Please verify sender before opening attachments or clicking on links.**

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Sorry again, reviewing my email I noticed a few more pictures didn't go thru. See how beautiful the basin was.

Jo Beanz

On Wed, Mar 9, 2022, 5:35 PM Shari Wasson <shari_wasson@hotmail.com> wrote:

> Great comments, Jo!
>
> Sent from Outlook
>
> ---
>
> **From:** Beanz Galvez <beanzgalvez@gmail.com>
> **Sent:** Wednesday, March 9, 2022 1:03 PM
> **To:** jwinter@uplandca.gov <jwinter@uplandca.gov>
> **Cc:** Janice Elliott <janiceelliott4upland@gmail.com>
> **Subject:** Villa Sirena NOP
>
> Dear Joshua Winter, (jwinter@uplandca.gov) March 8, 2022
>
> My name is Jo Beanz. I'm a long-time resident of Upland and part of Friends of Upland Wetlands (FUW). I am against the Villa Serena project and high density housing being constructed in the 15th Street Flood Control Basin for many reasons including the significant impacts to aesthetics, increased noise, reduced groundwater recharge, biological, and endangerment of the wildlife and flora and fauna in the area.
>
> I am providing photos from 5 years ago versus the last year in May, 2021 to document the wetlands and conditions at the 15th Street Flood Control Basin before and after "weed abatement" conducted by The Colonies Partners, L.P. If you look at the picture from 5 years ago you can see we had water, we had our flowers, we had our wildlife. And if you look at what they did the last past year (under the pretense of weed abatement), they bulldozed down to bare soil and applied herbicide, which left no vegetation. Were the appropriate agencies notified of these activities? Please give the 15th St Flood

Control Basin a chance to grow back up and see what it could become again before you allow “weed abatement” with a bulldozer and herbicide again or conduct the biological surveys for the environmental impact report required to allow development of homes.

Regarding aesthetics, my family bought their house because of the view, it was secluded, and isolated. Our family home is paid for. We consider it an investment. The Villa Serena project will block the current residents' beautiful views of the flood basin and the mountains. Now they're going to take that all away and build cookie cutter houses with no backyards, with the supposed tradeoff that they are putting in a play area and making it a gated community. All these factors and more will contribute to dropping our home values. It's not fair that we have our house paid for and now we're going to lose value to our homes. I hope you look at this with an open mind, as if it was your own home, your own investment, and your own family life.

I have attached a picture of the 15th Street Flood Control Basin when there was water, when there was flora and fauna. I have also attached a picture of what they did in May 2021 (and the previous year May 2020.) I've also attached a picture of a duckling family, with their mother duck walking into the Basin. After the weed abatement by bulldozers, the ducks’ home was destroyed. The next day we found the ducks dead on a city street (see the attached picture).

Please do what's right for Upland. Address and mitigate the significant impacts to aesthetics, increased noise, reduced groundwater recharge, biological, and endangerment of the wildlife and flora and fauna in the area.

Thank you for this opportunity to provide comments.

Sincerely
Jo Beanz
President
Friends of Upland Wetlands

Resized_Resized_20201112_140108.jpg

Capture+_2021-06-23-22-54-10.png

Capture+_2021-06-23-22-54-32.png

20210520_103101.jpg

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Search



Alex T Hwang
5h •

Lois Sicking Jo Beanz



1

Like Comment Send

Alex T Hwang
3h •

Lois Sicking Jo Beanz  Looks like they are clearing it right up to 9 houses adjacent to basi... See More



57% 10:54 PM

Search



Cathy Galvez

1 Share

Something entered through this broken chain link on 15 th Street.



GABRIELENO BAND OF MISSION INDIANS - KIZH NATION
Historically known as The Gabrielino Tribal Council - San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

February 17, 2022

Project Name: Villa Serena Specific Plan, City of Upland

Thank you for your letter regarding the project above. This is to concur that we are in agreement with the Specific Plan Amendment. However, our Tribal government would like to request consultation for any and all future projects when ground disturbance will be occurring within this location.

Sincerely,

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians – Kizh Nation
1(844)390-0787

Andrew Salas, Chairman | Nadine Salas, Vice-Chairman | Dr. Christina Swindall Martinez, secretary
Albert Perez, treasurer I | Martha Gonzalez Lemos, treasurer II | Richard Gradias, Chairman of the council of Elders

**From:** Tish anderson
**To:** Rudy Gmail. Zuniga
**Cc:** Joshua Winter; Janice Elliott
**Subject:** Villa Serena
**Date:** Wednesday, February 9, 2022 11:44:39 AM

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_____

Hello Vice Mayor Zuniga,

I hope that all is well with you and know that you continue to work hard for representing the stakeholders of Upland. As you know there has been a renewed effort in generating a “new” environmental impact report of the vacant property on 15th Street on behalf of the City of Upland.
With the current standing of the court decision of a negative declaration already in place whereas the residences of this neighborhood have standing and are against any development, I am voicing my opposition to any further action of new EIR’s being performed.

The impact to the location’s wildlife, municipal departments, and traffic will all create undesirable living conditions as well as affect property values.
Furthermore additional environmental impact reports are expensive and time consuming for the City. Does the City have extra funds to throw at continued dedicated billable staff hours and litigation? Last time I checked the budget there were no funds allocated or available for reports or further litigation. Maybe you can tell me why the City of Upland is continuing to fight the residences and siding with a Developer on the Villa Serena Project?

Sincerely,
Leticia Anderson

Sent from my iPhone

Dear Joshua Winter: March 9, 2022

My name is Lois Sicking Dieter. I am a long-time resident of Upland. I am submitting the following comments regarding the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed Villa Serena Specific Plan in the 15th Street Flood Control Basin.

Despite being opposed to the proposed Villa Serena project, I appreciate the opportunity to review the EIR when made public. The residents' expressed expectation is that the environmental report will be a legally accurate EIR at a level of specificity required for this complex project. My opposition to this project is based on the potential for significant environmental impacts to air quality, greenhouse gas emissions, aesthetics/visual, biological resources/wetlands/riparian, flood control detention basin capacity and flood control, water supply, groundwater, noise, transportation, drainage/absorption, and toxic/hazardous wastes from the adjacent landfill and stormwater pollution runoff.

In addition to the listed Air Resources Board, California Department of Fish and Wildlife (CDFW), Housing and Community Development, Native American Heritage Commission, and Santa Anna Regional Water Quality Control Board, other responsible trustee agencies include the San Bernardino County Flood Control District, Army Corp of Engineers, and the California State Division of Safety of Dams. Were all of these agencies informed of this NOP? If not, why not?

Previous "weed abatement" of the 15th Street Flood Control Basin in May, 2020 and May, 2021 consisted of removal of vegetation down to bare mineral soil by use of a bulldozer and followed by application of a herbicide as seen by local residents and reported to the CDFW. The City of Upland stated this was "weed abatement." However, previous to May of 2020, weed abatement in the basin did not include any heavy equipment such as a bulldozer and used handheld equipment and trimmers. Furthermore, weed abatement to bare mineral soil was not done and only began in May of 2020. We ask the City of Upland and applicant to conduct the full scope of surveys necessary to support the EIR prior to allowing another weed abatement. Furthermore, after these surveys are completed, to only allow use of handheld equipment and trimmers and not allow use of any heavy equipment in the basin.

Thank you for the opportunity to provide comments on this NOP.

Lois Sicking Dieter
LPSicking@cs.com
(909) 985-1397

| | |
|---|---|
| **From:** | NATASHA WALTON |
| **To:** | Joshua Winter |
| **Cc:** | Janice Elliott |
| **Subject:** | Fwd: N Walton Comments on Notice of Preparation (NOP) for Villa Serena Specific Plan EIR |
| **Date:** | Wednesday, March 9, 2022 7:54:52 PM |
| **Attachments:** | National Wetlands Inventory - Upland 15th St Basin - Wetlands Circled.jpg |

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Dear Mr. Winter:

Please accept my email below if you did not already receive it via your jwinter@ci.upland.ca.us email address. I had apparently used an incorrect email address for you in my previous email.

Thank You,

Natasha Walton

Get Outlook for iOS

**From:** NATASHA WALTON <notlaw_17@msn.com>
**Sent:** Wednesday, March 9, 2022 6:22 PM
**To:** jwinter@ci.upland.ca.us; jwinter@uplandca.com
**Subject:** N Walton Comments on Notice of Preparation (NOP) for Villa Serena Specific Plan EIR

Dear Mr. Winter:

I was having trouble sending this email right before 6PM today, please accept my following comments and attachment.

I am an 18-year Upland resident and wildlife biologist; I am very disappointed to learn that once again the City of Upland is planning on developing one of Upland's last remaining biological treasures which can be found in the 15th St flood control basin. Although I am glad to see that the Villa Serena Project Specific Plan will now be evaluated via an environmental impact report (EIR), vs. a less comprehensive initial study/mitigated negative declaration (IS/MND), this **Villa Serena project would still have significant negative effects on the invaluable biological resources, amongst other environmental resources, found at this site**. The effects of this project on the biological resources should be fully disclosed to the public before the Upland City Council and Planning Commission should even consider allowing such a project. To help ensure full disclosure of the project's effect on the biological resources at and near the 15th St. flood basin, I request the following items:

1. **Please fulfill Shari Wasson's requests as explained in her 3/9/2022 email** to Mr. Winters regarding the Villa Serena NOP. Her requests include the following: taking into consideration the state of and species occupying the west side of the basin prior to bulldozing in May of

2020 and 2021; prohibiting further bulldozing on any portion of the basin; including the east side of the basin in the biological assessment; addressing the loss of wetlands in the basin; conducting surveys using agency-approved protocols for special-status species, such as the coastal California gnatcatcher, least Bell's vireo, and burrowing owl; and conducting surveys throughout the year during different times of the day to evaluate the presence of the whole variety of species using the basin, such as frogs and bats.

2. **Please carry out a delineation of jurisdictional waters (jurisdictional delineation [JD])** for the entire basin since the entire basin would be impacted by this project. A JD would determine whether or not a 401 Regional Water Quality Control Board (RWQCB) permit, US Army Corps of Engineers 404 permit, and/or 1602 California Department of Fish and Wildlife (CDFW) permit needs to be obtained for the proposed project. However, many in the community are expecting the need for a streambed alteration agreement for this project since, as Ms. Wasson explained, the City of Upland had previously needed a streambed alteration agreement with CDFW for this area in 1999 with CDFW and the National Wetlands Inventory (NWI) indicates the presence of wetlands in this basin (see NWI attachment) Thus, I encourage early consultation with CDFW on this issue.

3. **Please include the east side of the 15$^{th}$ St. basin clearly in the project site maps** since this eastern side of the basin would be permanently impacted by the project as well since it will be modified greatly to accommodate the loss of the basin on the western side. In fact the name of the basin should also be included <u>in the title of this specific plan</u>.

However, please note that no EIR can capture the true impacts that the loss of our natural areas will have on our quality of life in Upland. The sounds, smells and sights of such an area can fulfill our hearts in ways that no scientist can measure and no city can mitigate for its loss.

I have hope that the city staff, planning commission, and city council will realize that this project site must be **preserved for flood control and as special place for our native wildlife and plants, and, yes, even our hearts.**

Thank you for your time and consideration.

Sincerely,

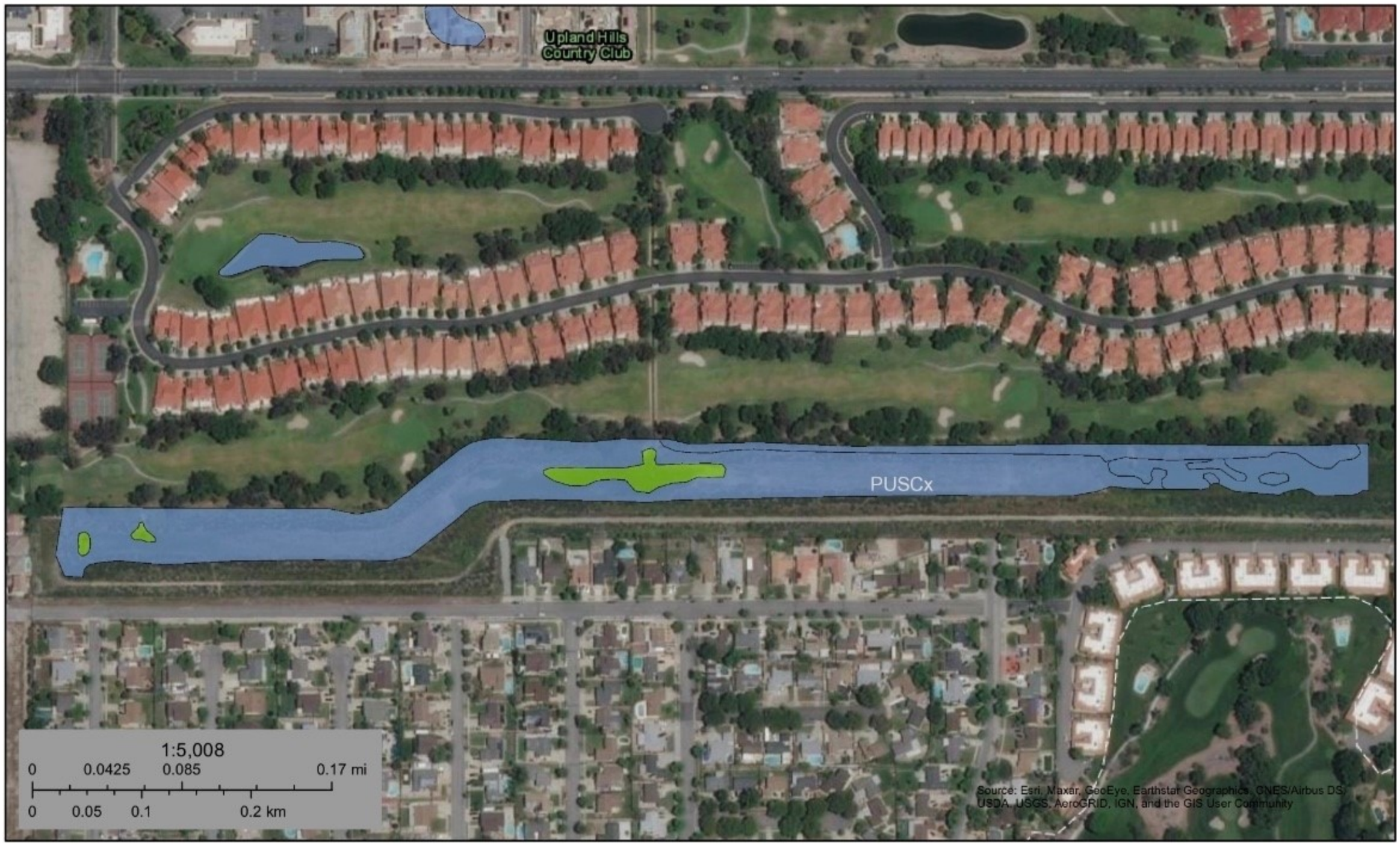
Natasha Walton, MS

Sent from Mail for Windows 10

U.S. Fish and Wildlife Service

# National Wetlands Inventory

## Upland 15th Street Basin




May 17, 2021

**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

**From:** Quechan Historic Preservation Officer
**To:** Joshua Winter
**Subject:** Villa Serena Specific Plan
**Date:** Wednesday, February 23, 2022 11:55:29 AM
**Attachments:** image001.jpg

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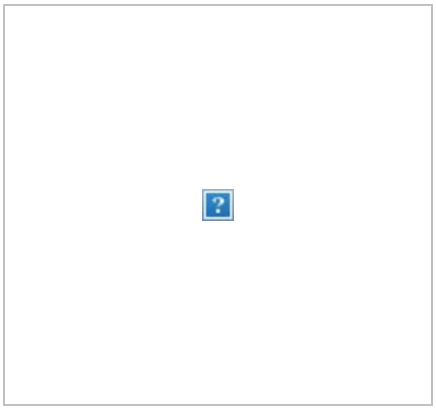
This email is to inform you that we have no comments on this project. We defer to the more local Tribes and support their decisions on the projects.

*Thank you,*
*H. Jill McCormick, M.A.*

Quechan Indian Tribe
Historic Preservation Officer
P.O. Box 1899
Yuma, AZ 85366-1899
Office: 760-572-2423
Cell: 928-261-0254
E-mail: historicpreservation@quechantribe.com



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**From:** Ryan Nordness
**To:** Joshua Winter
**Subject:** EIR City of Upland NOP for the Villa Serena Specific Plan DEIR
**Date:** Wednesday, March 9, 2022 12:32:49 PM

**WARNING: External email. Please verify sender before opening attachments or clicking on links.**

Hello Mr. Winter,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on March 9th, pursuant to CEQA (as amended, 2015) and CA PRC 21080.3.1. The proposed project area exists within Serrano ancestral territory and, therefore, is of interest to the Tribe. However, due to the nature and location of the proposed project, and given the CRM Department's present state of knowledge, SMBMI does not have any concerns with the project's implementation, as planned, at this time. As a result, SMBMI requests that the following language be made a part of the project/permit/plan conditions:

**CUL MMs**

In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed within TCR-1, regarding any pre-contact and/or historic-era finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

If significant pre-contact and/or historic-era cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to SMBMI for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

**TCR MMs**

The San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed in CR-1, of any pre-contact and/or historic-era cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources

Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on-site.

Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to SMBMI. The Lead Agency and/or applicant shall, in good faith, consult with SMBMI throughout the life of the project.

*Note: San Manuel Band of Mission Indians realizes that there may be additional tribes claiming cultural affiliation to the area; however, San Manuel Band of Mission Indians can only speak for itself. The Tribe has no objection if the agency, developer, and/or archaeologist wishes to consult with other tribes in addition to SMBMI and if the Lead Agency wishes to revise the conditions to recognize additional tribes.*

Please provide the final copy of the project/permit/plan conditions so that SMBMI may review the included language. This communication concludes SMBMI's input on this project, at this time, and no additional consultation pursuant to CEQA is required unless there is an unanticipated discovery of cultural resources during project implementation. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience, as I will be your Point of Contact (POC) for SMBMI with respect to this project.

Respectfully,
Ryan Nordness

**Ryan Nordness**
Cultural Resource Analyst
Ryan.Nordness@sanmanuel-nsn.gov
O:(909) 864-8933 Ext 50-2022
M:(909) 838-4053
26569 Community Center Dr Highland, California 92346

Main Office - 825 East Third Street, San Bernardino, CA 92415-0835 | Phone: 909.387.7910 Fax: 909.387.7911
www.SBCounty.gov

SAN BERNARDINO COUNTY

Department of Public Works
- Flood Control
- Operations
- Solid Waste Management
- Special Districts
- Surveyor
- Transportation

Brendon Biggs, M.S., P.E.
Director

Noel Castillo, P.E.
Assistant Director

Trevor Leja
Assistant Director

March 8 2022

File: 10(ENV)-4.01

CITY OF UPLAND
Attn: Joshua Winter
Development Services Department,
Planning Division
460 North Euclid Avenue
Upland, CA 91786
jwinter@uplandca.gov

**Transmitted Via Email**

**RE: CEQA – NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE VILLA SERENA SPECIFIC PLAN**

Dear Mr. Winter:

Thank you for allowing the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. We received this request on February 23, 2022 and pursuant to our review, we have the following comments:

**Flood Control Planning & Water Resources Division (Michael Fam, Chief, 909-387-8120):**

1. We are aware there may be storm drains in and around the site that may be affected by the proposed Project. When planning for or altering existing or future storm drains, be advised that the Proposed Project is subject to both the Comprehensive Storm Drain Plan (CSDP) #7, dated July 1966, and the Upland Master Plan of Drainage (MPD) dated, November 1994. These are to be used as a guideline for drainage in the area and are available in the County's Flood Control District Offices. Any revision to the plans drainage should be reviewed and approved by the City. Should construction of new, or alterations to existing storm drains be necessary as part of the Proposed Project, their impacts and any required mitigation should be discussed within the Draft EIR before the document is adopted by the Lead Agency.

2. The District's recommendations are most often made for site specific conditions. Therefore, the recommendations made here are general in nature until such time as more detailed plans become available.

3. According to the most recent FEMA Flood Insurance Rate Map (FIRM), Panel 06071C8607H, dated August 28, 2008, the Project lies within Zone X (outside the 500-yr. floodplain). Impacts associated with the occurrence of the project within the mentioned floodplain and mitigation, should be discussed within the environmental documents prior to adoption or certification.

4. The District owns the existing West Cucamonga By-Pass Channel within the scope of the Project. Therefore, other on-site, or off-site improvements may be required, which cannot be determined from

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) First District | Janice Rutherford Second District | Dawn Rowe Vice Chair, Third District | Curt Hagman Chairman, Fourth District | Joe Baca, Jr. Fifth District
Leonard X. Hernandez Chief Executive Officer

5. the tentative plans at this time, and would have to be reviewed after more complete improvement plans and drainage analysis have been submitted to the District.
6. One of the benefits of the CSDP/MPD is to identify the alignment of future and flood control facilities. It is hoped that the City will continue to use this document to protect the alignment of future facilities.
7. We recommend that the November 1994, Upland MPD for the City of Upland, prepared by Williamson & Schmid - Consulting Civil Engineers and Land Surveyors, be utilized in the design of drainage facilities.

**Permits/Operations Support Division (Sameh Basta, Chief, 909-387-7995):**

1. The project site is located outside of the District's Right-of-way. Based on the parcel number provided no permit is anticipated to be required at this time. However, any encroachment on the District's right-of-way or facilities, including but not limited to access, fencing and grading, utility crossings, landscaping, new and/or alteration to drainage connections will require a permit from the SBCFCD prior to start of construction. The necessity for permits, and any impacts associated with them, should be addressed in the Draft EIR prior to adoption and certification. If you have any questions regarding this process, please contact the FCD Permit Section at (909) 387-1863

We respectfully request to be included on the circulation list for all project notices, public reviews, or public hearings. In closing, I would like to thank you again for allowing the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. Should you have any questions or need additional clarification, please contact the individuals who provided the specific comment, as listed above.

Sincerely,

Michael Perry

Michael R. Perry
Supervising Planner
Environmental Management

MP:AG:mm

SCAG
INNOVATING FOR A BETTER TOMORROW

SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS
900 Wilshire Blvd., Ste. 1700
Los Angeles, CA 90017
T: (213) 236-1800
www.scag.ca.gov

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Transportation
Sean Ashton, Downey

**March 17, 2022**

Mr. Joshua Winter, Associate Planner
City of Upland Development Services Department, Planning Division
460 North Euclid Avenue
Upland, California 91786
Phone: (909) 931-4130
E-mail: jwinter@uplandca.gov

**RE: SCAG Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Villa Serena Specific Plan [SCAG NO. IGR10574]**

Dear Mr. Winter,

Thank you for submitting the Notice of Preparation of a Draft Environmental Impact Report for the Villa Serena Specific Plan ("proposed project") to the Southern California Association of Governments (SCAG) for review and comment. SCAG is responsible for providing informational resources to regionally significant plans, projects, and programs per the California Environmental Quality Act (CEQA) to facilitate the consistency of these projects with SCAG's adopted regional plans, to be determined by the lead agencies.[1]

Pursuant to Senate Bill (SB) 375, SCAG is the designated Regional Transportation Planning Agency under state law and is responsible for preparation of the Regional Transportation Plan (RTP) including the Sustainable Communities Strategy (SCS). SCAG's feedback is intended to assist local jurisdictions and project proponents to implement projects that have the potential to contribute to attainment of Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) goals and align with RTP/SCS policies. Finally, SCAG is also the authorized regional agency for Intergovernmental Review (IGR) of programs proposed for Federal financial assistance and direct Federal development activities, pursuant to Presidential Executive Order 12372.

SCAG staff has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Villa Serena Specific Plan in San Bernardino County. The proposed project includes the establishment of a residential specific plan for the development of a gated residential community with 65 single-family detached residential units and on-site active and passive recreational amenities on a 9.2-acre site.

**When available, please email environmental documentation to IGR@scag.ca.gov providing, at a minimum, the full public comment period for review.**

If you have any questions regarding the attached comments, please contact the Intergovernmental Review (IGR) Program, attn.: Anita Au, Senior Regional Planner, at (213) 236-1874 or IGR@scag.ca.gov. Thank you.

Sincerely,

Frank Wen, Ph.D.
Manager, Planning Strategy Department

[1] Lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the 2020 RTP/SCS (Connect SoCal) for the purpose of determining consistency for CEQA.

**COMMENTS ON THE NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE VILLA SERENA SPECIFIC PLAN [SCAG NO. IGR10574]**

**CONSISTENCY WITH CONNECT SOCAL**

SCAG provides informational resources to facilitate the consistency of the proposed project with the adopted 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS or Connect SoCal). For the purpose of determining consistency with CEQA, lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with Connect SoCal.

**CONNECT SOCAL GOALS**

The SCAG Regional Council fully adopted Connect SoCal in September 2020. Connect SoCal, also known as the 2020 – 2045 RTP/SCS, builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. The long-range visioning plan balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health. The goals included in Connect SoCal may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project. Among the relevant goals of Connect SoCal are the following:

| SCAG CONNECT SOCAL GOALS | |
|---|---|
| Goal #1: | *Encourage regional economic prosperity and global competitiveness* |
| Goal #2: | *Improve mobility, accessibility, reliability and travel safety for people and goods* |
| Goal #3: | *Enhance the preservation, security, and resilience of the regional transportation system* |
| Goal #4: | *Increase person and goods movement and travel choices within the transportation system* |
| Goal #5: | *Reduce greenhouse gas emissions and improve air quality* |
| Goal #6: | *Support healthy and equitable communities* |
| Goal #7: | *Adapt to a changing climate and support an integrated regional development pattern and transportation network* |
| Goal #8: | *Leverage new transportation technologies and data-driven solutions that result in more efficient travel* |
| Goal #9: | *Encourage development of diverse housing types in areas that are supported by multiple transportation options* |
| Goal #10: | *Promote conservation of natural and agricultural lands and restoration of habitats* |

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the goals and supportive analysis in a table format. Suggested format is as follows:

| SCAG CONNECT SOCAL GOALS | | |
|---|---|---|
| | Goal | Analysis |
| Goal #1: | *Encourage regional economic prosperity and global competitiveness* | *Consistent: Statement as to why;*<br>*Not-Consistent: Statement as to why;*<br>*Or*<br>*Not Applicable: Statement as to why;*<br>*DEIR page number reference* |
| Goal #2: | *Improve mobility, accessibility, reliability and travel safety for people and goods* | *Consistent: Statement as to why;*<br>*Not-Consistent: Statement as to why;*<br>*Or*<br>*Not Applicable: Statement as to why;*<br>*DEIR page number reference* |
| etc. | | etc. |

**Connect SoCal Strategies**

To achieve the goals of Connect SoCal, a wide range of land use and transportation strategies are included in the accompanying twenty (20) technical reports. Of particular note are multiple strategies included in Chapter 3 of Connect SoCal intended to support implementation of the regional Sustainable Communities Strategy (SCS) framed within the context of focusing growth near destinations and mobility options; promoting diverse housing choices; leveraging technology innovations; supporting implementation of sustainability policies; and promoting a Green Region. To view Connect SoCal and the accompanying technical reports, please visit the Connect SoCal webpage. Connect SoCal builds upon the progress from previous RTP/SCS cycles and continues to focus on integrated, coordinated, and balanced planning for land use and transportation that helps the SCAG region strive towards a more sustainable region, while meeting statutory requirements pertinent to RTP/SCSs. These strategies within the regional context are provided as guidance for lead agencies such as local jurisdictions when the proposed project is under consideration.

Connect SoCal also identifies natural lands resources and outlines strategies to protect and enhance biodiversity, habitat, wildlife corridors and agricultural areas in the SCAG region. For further information on these strategies, please review the 2020 Connect SoCal Natural and Farm & Farm Lands Conservation Technical Report. The proposed project appears to be located in or near a Freshwater Pond and/or Freshwater Emergent Wetland according to the U.S. Fish & Wildlife Service National Wetlands Inventory, which is viewable at https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.

**DEMOGRAPHICS AND GROWTH FORECASTS**

A key, formative step in projecting future population, households, and employment through 2045 for Connect SoCal was the generation of a forecast of regional and county level growth in collaboration with expert demographers and economists on Southern California. From there, jurisdictional level forecasts were ground-truthed by subregions and local agencies, which helped SCAG identify opportunities and barriers to future development. This forecast helps the region understand, in a very general sense, where we are expected to grow, and allows SCAG to focus attention on areas that are experiencing change and may have increased transportation needs. After a year-long engagement effort with all 197 jurisdictions one-on-one, 82 percent of SCAG's 197 jurisdictions provided feedback on the forecast of future growth for Connect SoCal. SCAG also sought feedback on potential sustainable growth strategies from a broad range of stakeholder groups – including local jurisdictions, county transportation commissions, other partner agencies, industry groups, community-based organizations, and the general public. Connect SoCal utilizes a bottom-up approach in that total projected growth for each jurisdiction reflects feedback received from jurisdiction staff, including city managers, community development/planning directors, and local staff. Growth at the neighborhood level (i.e., transportation analysis zone (TAZ) reflects entitled projects and adheres to current general and specific plan maximum densities as conveyed by jurisdictions (except in cases where entitled projects and development

agreements exceed these capacities as calculated by SCAG). Neighborhood level growth projections also feature strategies that help to reduce greenhouse gas emissions (GHG) from automobiles and light trucks to achieve Southern California's GHG reduction target, approved by the California Air Resources Board (CARB) in accordance with state planning law. Connect SoCal's Forecasted Development Pattern is utilized for long range modeling purposes and does not supersede actions taken by elected bodies on future development, including entitlements and development agreements. SCAG does not have the authority to implement the plan -- neither through decisions about what type of development is built where, nor what transportation projects are ultimately built, as Connect SoCal is adopted at the jurisdictional level. Achieving a sustained regional outcome depends upon informed and intentional local action. To access jurisdictional level growth estimates and forecasts for years 2016 and 2045, please refer to the Connect SoCal Demographics and Growth Forecast Technical Report. The growth forecasts for the region and applicable jurisdictions are below.

| | Adopted SCAG Region Wide Forecasts | | | | Adopted City of Upland Forecasts | | | |
|---|---|---|---|---|---|---|---|---|
| | **Year 2020** | **Year 2030** | **Year 2035** | **Year 2045** | **Year 2020** | **Year 2030** | **Year 2035** | **Year 2045** |
| Population | 19,517,731 | 20,821,171 | 21,443,006 | 22,503,899 | 78,531 | 84,208 | 87,158 | 92,963 |
| Households | 6,333,458 | 6,902,821 | 7,170,110 | 7,633,451 | 27,016 | 29,336 | 30,496 | 32,817 |
| Employment | 8,695,427 | 9,303,627 | 9,566,384 | 10,048,822 | 36,769 | 38,960 | 40,056 | 42,247 |

**MITIGATION MEASURES**

SCAG staff recommends that you review the Final Program Environmental Impact Report (Final PEIR) for Connect SoCal for guidance, as appropriate. SCAG's Regional Council certified the PEIR and adopted the associated Findings of Fact and a Statement of Overriding Considerations (FOF/SOC) and Mitigation Monitoring and Reporting Program (MMRP) on May 7, 2020 and also adopted a PEIR Addendum and amended the MMRP on September 3, 2020 (please see the PEIR webpage and scroll to the bottom of the page for the PEIR Addendum). The PEIR includes a list of project-level performance standards-based mitigation measures that may be considered for adoption and implementation by lead, responsible, or trustee agencies in the region, as applicable and feasible. Project-level mitigation measures are within responsibility, authority, and/or jurisdiction of project-implementing agency or other public agency serving as lead agency under CEQA in subsequent project- and site- specific design, CEQA review, and decision-making processes, to meet the performance standards for each of the CEQA resource categories.

March 9, 2022

Dear Joshua Winter:

My name is Shari Wasson, I am a long-time resident of Upland. I have been naturalist and a birder for over 30 years, having taken courses at the college level in California Natural History (including bird identification) and Field Botany. I am submitting the following comments regarding the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed Villa Serena Specific Plan.

Although I am against the development of the 15th Street flood basin, I am pleased that the city is preparing an EIR for this project instead of a less comprehensive analysis like that of an Initial Study/Mitigated Negative Declaration (IS/MND). A thorough and accurate EIR should help ensure that the Upland community has a complete understanding of how their environment would be significantly affected by this project if it is approved by the city council.

I and other residents remain greatly concerned about the impacts this project will have on the habitat and the biological resources within the proposed housing development site and the adjacent 11.1 acres. We are also concerned about the damage that has been done to the habitat in the basin over the last 2 years, and the potential for this destruction to result in an inaccurate biological assessment of the site.

**Previous bulldozing and degradation of habitat on west side:**

In May 2020, during the nesting bird season, the mature native coastal sage scrub habitat on the west side of the basin, where the housing development has been proposed, was bulldozed under the label of 'weed abatement.' This destruction was 'wholesale' in that nearly all plants, including small trees and numerous stands of prickly pear cactus were destroyed or severely damaged. In May of 2021, this side of the basin was again bulldozed under the auspices of 'weed abatement.' According to several residents living in proximity of the basin, in previous years the floor of the basin would occasionally be cleared of plants, and weed-whacking for fire danger at the street margin would occur each Spring. No one I spoke to could recall a time when the basin slopes had been cleared of mature plants through bulldozing.

Due to the bulldozing, the habitat on the west side of the basin has been severely damaged and does not presently reflect the quality and vitality of the habitat prior to these destructive activities.

**Including the state of the habitat on the west side prior to bulldozing:**
A fair a comprehensive biological assessment of the site needs to take into consideration the state of the west side of basin prior to bulldozing activities. Species that are regenerating after the bulldozing should be assessed, along with the small areas of habitat on this side that remain intact. These will help provide a sense of the types of species on the site, if not the density, or the vitality.

In addition, as the east side of the basin and the west side of the basin are contiguous, we may presume that they shared some common plant and animal species. Thus, the intact habitat and species found on the east side of the basin may be considered reflective of the habitat and species that had been on the west side. An assessment of the east side should be used to help inform the assessment of the west side.

In order to help demonstrate the density and vitality of the habitat prior to bulldozing, I am attaching a word document titled 'NOP Attachment - Basin and Bulldozing' that contains some photos of the west side of the basin before, during, and after bulldozing. In some of the photos, I have also labeled some of coastal sage scrub plant species visible in the foreground of the images.

I am also attaching a plant species list (NOP Attachment – Plant List April 2020) and a bird species list (NOP Attachment – Bird List April 2020) compiled from surveys conducted in the basin on April 10, 11, 12, 2020, prior the first bulldozing on May 14 and 15, 2020. These lists had previously been submitted for public comment to the City Council at the public hearing on April 13, 2020 regarding the Villa Serena Development.

**Prohibition of further bulldozing of habitat:**

In order to promote as fair and accurate biological assessment as possible for the EIR, there must be protections in place that will prevent further destruction and degradation of the habitat throughout the basin. Therefore, I request that the City prohibit further bulldozing of any and all parts of the basin, both west and east.

**Including the east side of basin in biological assessment**:

It is important to include the east side of the basin in the biological analysis in order to more accurately develop an analysis of the west side; however, it also needs a thorough assessment since the project proposes modifications to this area. Assessment of this area appears to have been largely overlooked in the original IS/MND. The original IS/MND for this project indicated that modifications to the east side would include grading a large portion of the basin to create a new footprint at its western end, creating new slopes and new berms, etc. This activity would surely result in the damage and destruction of significant portions of habitat on the east side of the basin. This is habitat that, like the west side, includes coastal sage scrub and wetland areas. The EIR needs to address the need for mitigation for both the wetland and the coastal sage scrub habitats.

As the project entails significant modifications to the east 11.1 acres of the flood basin, with this area remaining an active flood basin, perhaps the project should more accurately be titled The Villa Serena and 15th Street Flood Basin Specific Plan. The EIR should comprehensively address the modifications to this side of the basin including detailed plans covering depths, slopes, berm height changes, capacity, flood risks, access roads, planned habitat restoration, etc. Furthermore, all areas within the 11.1 acres that will be affected by the modifications should be included in the project footprint map via shading.

In addition, the following trustee agencies should be consulted regarding the proposed modifications to the basin: California State Division of Safety of Dams, and The San Bernardino County Flood Control District.

**Wetland/riparian project issue:**

In the Notice of Completion and Environmental Document Transmittal, the category of Wetland/Riparian is not checked in the section titled 'Project Issues Discussed in Document.' However, the EIR should address the issue of Wetland/Riparian habitat, as there are several wetland areas spanning the flood basin, from the west side (proposed housing development site) to the east side (proposed modified basin). Some of the plant species supported by these wetlands include: cattails (Typha sp.), sandbar willow (Salix exigua), watercress (Nasturtium officinale), water smartweed (Persicaria hydropiperoides), and seep monkey flower (Erythranthe guttata, formerly

classified as Mimulus guttata).

The proposed site of the housing development contains wetland mitigation areas for previously existing wetlands that were part of a 1999 streambed alteration agreement between the City and CDFW. I am attaching a copy of the 1999 Streambed Alteration Agreement and the 2006 Staff Report on the state of wetlands.

The 2006 Staff Report on the state of the wetlands contains an aerial photo of the basin with wetlands stations numbered 1 – 6. Wetlands at stations 4, 5, and 6 are on the west side of the basin, within the footprint of the proposed housing development, and would be destroyed if the project is approved. The east side wetlands are also subject to destruction by the project due to the modifications proposed on that side. The EIR needs to address mitigation for these wetlands.

I am attaching a word document titled 'NOP Attachment -Wetlands' containing screen shots which compare the labeled aerial photo of the wetlands with an aerial photo of the project site provided in the NOP. Comparing these two photos clarifies the location of wetlands 4, 5, and 6 relative to the housing development site. This word document also contains photos of the some of the wetlands as they appeared on April 9, 2020, prior to the bulldozing, and I have labeled some of wetland plant species visible in one of the images.

**Biologist's Memo:**

I am attaching a memorandum (Memo Upland Hills TEsurveys 3Nov2a) written by Dan Cooper, a biologist and bird expert, which further corroborates the presence of the wetlands within the basin. Mr. Cooper's visit took place on July 24, 2020, after the first bulldozing of the west side of the basin. Mr. Cooper's memo notes the presence of several of the wetland plant species mentioned in the section above, and further contains information about the coastal sage scrub habitat, the state of regeneration of the habitat on the west side after the first bulldozing, a list of bird species observed on the site at the time of his visit, and recommendations regarding surveys for the coastal California gnatcatcher *(threatened),* least Bell's vireo *(endangered)*, and burrowing owl *(species of special concern).* It is important that protocol surveys for these species be conducted.

Mr. Cooper's memo also notes that at the time of his visit, several of the bulldozed plants were "vigorously re-sprouting." This further supports the need to factor in the state of the habitat in the basin prior to bulldozing, as it suggests that without repeated and regular destruction, the habitat is capable of reflecting its original intact state.

**Need for multiple site visits at different times of year and times of day:**

The basin supports a host of native plant, animal and bird species, several of which are associated with wetland habitats. A comprehensive assessment and inventory of all species occurring in the basin needs to be conducted so that the public has as clear an understanding as possible of the resources that will be affected and that need to be mitigated for should the project be approved. To this end, the biological assessment should involve multiple visits to the site, at differing times of the year, and times of day. Evening visits should be included to assess the presence of nocturnal species such as bats, rodents, amphibians, and insects. Palm trees such as are found on the site, are known to provide roosts for the western yellow bat, though the presence of water and open space would attract various bat species in their hunt nocturnal insects. In addition, I and other neighbors can certainly attest to the presence in the basin of the Baja California tree frog which is heard with seasonal regularity in the evenings, but which may go unnoticed in the day.

Thank you for your time and consideration.

Sincerely,

Shari Wasson

7 Attachments:

CDFW 1999 Streambed Alteration Agreement w/ City of Upland
Upland's 2006 Wetlands Staff Report (related to 1999 Streambed Alteration Agreement)
NOP Attachment – Bird List April 2020
NOP Attachment – Plant List April 2020
Memo Upland Hills TEsurveys 3Nov2a
NOP Attachment - Basin and Bulldozing

NOP Attachment -Wetlands

S ATE OF CALIFORNIA-THE RESOURCES AGENCY GRAY DAVIS, Governor
**DEPARTMENT OF FISH AND GAME**
3 Golden Shore, Suite 50
L ng Beach, California 90802
(562) 590-5137

RECEIVED
NOV 4 1999
CITY OF UPLAND
PUBLIC WORKS DEPARTMENT

AGREEMENT REGARDING PROPOSED ACTIVITIES SUBJECT TO
CALIFORNIA FISH AND GAME CODE SECTION 1601

NOTIFICATION NUMBER: 6-108-99

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called the Department, and Rob Turner of City of Upland, Public Works, P.O. Box 460, Upland, 91785, State of California, hereinafter called the **Operator**, is as follows:

WHEREAS, pursuant to Section 1601 of California Fish and Game Code, the Operator, on the 1st day of September 1999, notified the Department that they intend to divert or obstruct the natural flow of, or change the bed, channel, or bank of, or use material from the streambed(s)/lake of, the following water(s): 15th Street Flood Detention Basin associated with West Cucamonga Creek; tributary to Santa Ana River in San Bernardino County; located within Sections 5, Township 1S, Range 7W, USGS Map Ontario.

WHEREAS, the Department (represented by Rebecca Jones) has determined that such operations may substantially adversely affect existing fish and wildlife resources including: **red-tailed hawk, re-winged blackbird, cinnamon teal, mallard, killdeer, other birds, mammals, reptiles, amphibians,, plants, and other aquatic related resources and wildlife in and their associated areas affected by the proposed project in this agreement.**

THEREFORE, the Department hereby proposes measures to protect fish and wildlife resources during the Operator's work. The Operator hereby agrees to accept the following measures/conditions as part of the proposed work.

If the Operator's work changes from that stated in the notification specified above, this Agreement is no longer valid and a new notification shall be submitted to the Department of Fish and Game. Failure to comply with the provisions of this Agreement and with other pertinent code sections, including but not limited to Fish and Game Code Sections 5650, 5652, 5937, and 5948, may result in prosecution.

Nothing in this Agreement authorizes the Operator to trespass on any land or property, nor does it relieve the Operator of responsibility for compliance with applicable federal, state, or local laws or ordinances. A consummated Agreement does not constitute Department of Fish and Game endorsement of the proposed operation, or assure the Department's concurrence with permits required from other agencies.

**THIS AGREEMENT BECOMES EFFECTIVE ON date of Department's signature AND TERMINATES ON September 30, 2001 for the proposed projects only**. This agreement shall remain in effect for that time necessary to satisfy the terms and/or conditions of this agreement.

STREAMBED ALTERATION CONDITIONS FOR NOTIFICATION No. 6-108-99:

1. The following provisions constitute the limit of activities agreed to and resolved by this Agreement. The signing of this Agreement does not imply that the Operator is precluded from doing other activities at the site. However, activities not specifically agreed to and resolved by this Agreement, shall be subject to separate notification pursuant to Fish and Game Code §1600.

2. The Operator proposes to alter the streambed to fill in approximately 11.2 acres of the flood control basin and deepen the remainder of the basin to maintain current flood protection. The basin is being filled at the request of the Santa Ana Regional Water Quality Board due to ground water impacts from an adjacent inactive landfill.

3. The agreed work includes activities associated with No. 2 above. The project area is located **at the Northeast corner of 15th Street and Campus Avenue, Upland** in **San Bernardino** County. Specific work areas and mitigation measures are described on/in the plans and documents submitted by the Operator and shall be implemented as proposed unless directed differently by this agreement.

4. The Operator shall request an extension, if needed, of this agreement prior to its termination. Extensions may be granted for up to 12 months from the date of termination of the agreement and are subject to departmental approval. The extension request and fees shall be submitted to the Department's Region 6 Office at the above address. If the Operator fails to request the extension prior to the agreement's termination then the Operator shall submit a new notification with fees and required information to the Department. Any activities conducted under an expired agreement are a violation of Fish and Game Code Section 1600 et. seq. The Operator may request up to a maximum of 2 extensions of this agreement.

5. Disturbance or removal of vegetation shall not exceed the limits approved by the Department. Restoration shall include the revegetation of stripped or exposed areas with vegetation native to the area.

6. Equipment shall not be operated in wetted areas (including but not limited to ponded, flowing, or wetland areas) except as provided for in condition 7.

7. When work in a flowing stream is unavoidable, the entire stream flow shall be diverted around the work area by a barrier, temporary culvert, new channel, or other means approved by the Department. Construction of the barrier and/or the new channel shall normally begin in the downstream area and continue in an upstream direction, and the flow shall be diverted only when construction of the diversion is completed. Channel bank or barrier construction shall be adequate to prevent seepage into or from the work area. Channel banks or barriers shall not be made of earth or other substances subject to erosion unless first enclosed by sheet piling, rock riprap, or other protective material. The enclosure and the supportive material shall be removed when the work is completed and removal shall normally proceed from downstream in an upstream direction.

8. Preparation shall be made so that runoff from steep, erodible surfaces will be diverted into stable areas with little erosion potential.

9. The perimeter of the work site shall be adequately flagged to prevent damage to adjacent riparian habitat.

10. The Operator shall not remove vegetation within the stream from March 1 to August 30 to avoid impacts to nesting birds, unless a preconstruction survey by a qualifies biological consultant indicates the absence of any nesting birds at the work site.

11. This agreement does not authorize the take of any listed species. If threatened or endangered species occur within the proposed work area, or could be impacted by the work proposed, this agreement shall not be valid until the Operator obtains the required state and federal threatened and endangered species permits.

12. If mature perennial trees have been removed from the stream's banks, they shall be replaced in-kind, and maintained until established, under the direction of a Department representative.

13. There shall be no loss of wetland habitat and function. Impacts to wetland habitat shall be mitigated at a 1.5 to 1 ratio by management of the basin to allow for retention of wetland habitat at the eastern sector, which grows as a result of flow and peculation in the basin.

14. An annual report shall be submitted to the Department by Jan. 1 of each year for 5 years after planting. This report shall include the survival, % cover, and height of both tree and shrub species. The number by species of plants repiaced, an overview of the revegetation effort, and the method used to assess these parameters shall also be included. Photos from designated photo stations shall be included.

15. Staging/storage areas for equipment and materials shall be located outside of the stream/lake.

16. Spoil sites shall not be located within a stream/lake, where spoil shall be washed back into a stream/lake, or where it will cover aquatic or riparian vegetation.

17. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

18. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

19. Nc debris, soil, silt, sand bark, slash, sawdust, rubbish, cement or concrete or washings thereof oil or petroleum products or other organic or earthen material from any maintenance, construction, or associated activity of whatever nature shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the state. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream.

20. The Operator shall **provide a copy of this** Agreement **to all contractors, subcontractors, and the Operator's project supervisors. Copies of the** Agreement **shall be readily available at work sites at all times during periods of active work** and must be presented to any Department personnel, or personnel from another agency upon demand.

21. The Operator shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Operator to ensure compliance. The clean up of all pollution spills shall begin immediately. The Operator shall notify the Department immediately of any spills and shall consult with the Department regarding clean-up procedures and requirements.

22. The Operator, contractors, subcontractors or any of the individuals mentioned above are jointly and severely liable for compliance with the provisions of this agreement. Any violation of the provisions of this agreement shall cause to cancel this agreement, and all activity shall stop immediately and shall not proceed until the Department has taken all of its legal actions and/or another agreement is made.

23. The Department reserves the right to enter the project site at any time to ensure compliance with the terms and conditions of this agreement. Copies of this agreement shall be readily available at work sites at all times during periods of active work and must be presented to any Department personnel upon demand.

24. The Operator **shall** notify the Department, **in writing, at least five (5) days prior to initiation of construction (project) activities and at least five (5) days prior to completion of construction (project) activities.** Notification shall be sent to: Department **of Fish and Game, Environmental Services Division, 330 Golden Shore, Suite 50, Long Beach, California 90802.**

25. The Department reserves the right to suspend or cancel this agreement for other reasons, including but not limited to, the following:
    a. The Department determines that the information provided by the Operator in support of the Notification/Agreement is incomplete or inaccurate;
    b. The Department obtains new information that was not known to it in preparing the terms and conditions of the agreement;
    c. The project or project activities as described in the Notification/Agreement have changed; and
    d. The conditions of or affecting fish and wildlife resources change or the Department determines that project activities will result in an adverse effect on the environment.

Prepared by: Rebecca Jones

CONCURRENCE

| (Operator's name) | California Dept. of Fish and Game |
|---|---|
| Rob Turner 10/26/99 | 10/31/99 |
| ROB TURNER Date | CURT TAUCHER Date |
| Public Works Director Title | Regional Manager, Reg. 6 Title |




# 15th St Basin - East "Wetlands"

2.2 acres at the east end

N

100ft

CityGIS

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Upland

# 15th ST FLOOD CONTROL BASIN

PRESENT (2007) POST DEVELOPMENT CONDITIONS

N

550ft

CityGIS 6.0

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**STREAMBED ALTERATION AGREEMENT – 6-108-99**
**15TH STREET FLOOD CONTROL BASIN**
**CITY OF UPLAND**

**ANNUAL REPORT – CY 2006**

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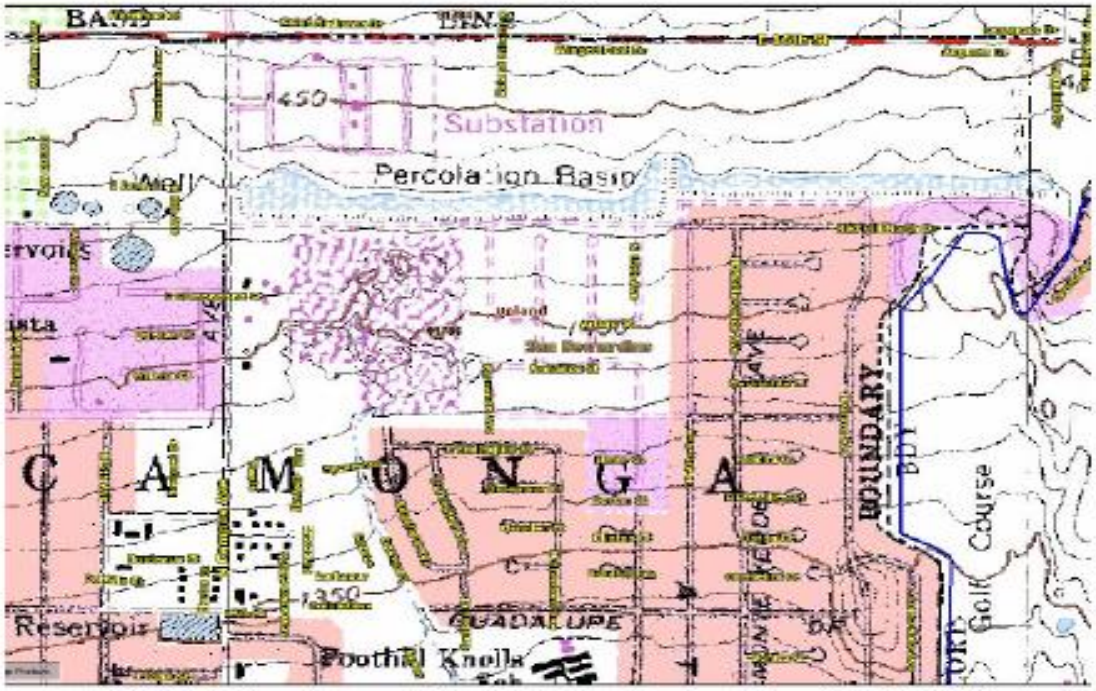
## BACKGROUND :

The 15th Street Basin is at the upstream reach of the West Cucamonga Creek system. It functions as a flood attenuation basin to minimize flows below 14th St during a 100-year storm event. Prior to calendar year (CY) 2000, it consisted of four (4) parcels totaling about 32 acres.

Below is a 'snap-shot' of a USGS map depicting the limits of the original 15th St basin as it existed prior to CY 2000.




15th St Basin - City of Upland
USGS Topographic Map

In CY 2000, on orders from the Santa Ana Regional Water Quality Control Board to stop water impoundment or percolation north of the Upland Landfill, the City of Upland completed a capital improvement project to fill the westerly 12 acres and reduce the size of the basin. Before the project was implemented a biological assessment was completed and the results are discussed below.

**PRE-CONSTRUCTION (CY 1998) SITE CONDITIONS AND BIOLOGICAL RESOURCES :**

LSA Associates conducted a biological assessment of the whole 32-acre basin, as well as a literature review to identify any sensitive elements known or reported. A field survey was also performed by an LSA biologist, noting all observed plants and animal species. In addition, a 'wetlands' delineation was performed following the US Army Corps of Engineers Wetlands Delineation Manual (1987).

Their findings indicated the habitat quality of the site was considered to be of low value due to the limited diversity of vegetation, the suburban setting and the regular annual maintenance required for the safe operation of the flood basins. Vegetation consisted almost entirely of low-growing annual and perennial species. This single strata of vegetation provided very limited structural diversity and almost no cover value. The surrounding land uses also affected the habitat value of the site.

The single habitat component of any notable value on the site is the presence of water, albeit seasonally. Although there was water present on at least a seasonal basis, the uniform topography of the site and design features (i.e., spillways, flat bottom and evenly sloping sides) ensured that there is only shallow ponding of water. This also limited the habitat value of the site.

LSA delineated 6.5 acres spread over the entire 32 acres of the basin, mainly on the basin floor at areas immediately downstream of storm drain outlets to the basin, as wetlands. Within the westerly 11.2 acres that was filled, only about 1.2 acres were delineated as such.

This 1.2 acres was what was essentially lost due to the filling, with 5.3 acres remaining intact on the eastern unfilled portions of the basin.

**MITIGATION CLAUSE UNDER THE STREAMBED ALTERATION AGREEMENT 6-108-99 :**

Agreement No 6-108-99 Item 13, stipulates that -

> "There shall be no loss of wetland habitat and function. Impacts to wetland habitat shall be mitigated at a 1.5 to 1 ratio by management of the basin to allow for retention of wetland habitat at the eastern sector which grows as a result of flow and percolation in the basin".

As discussed above, of the 6.5 acres delineated as wetlands, only 1.2 was lost as a result of the filling of the western 11.2 acres of the basin. In accordance with the permit, this 'lost' wetland area require a 1.8 acre replacement to be established within the remaining unfilled area

of the flood basin, in addition to the 5.3 acres for a total of 7.1 acres of wetlands over the remaining 20-acres of flood basin.

Below is a June 2000 photo showing the area to be abandoned and filled, prior to any clearing, demolition and grading work being done. There were no trees in the basin. The only vegetation are cattails growing along the toe of the slope immediately downstream of the 15th St Storm drain outfall to the basin.



Below is a picture of the same area taken during the later part of December 2000, after the backfilling work was completed.



On December 28, 2000, a letter was submitted to DFG informing of the completion of the 15th St Basin modifications. The report also stated that there were no trees removed from the basin. The only vegetative species at the basin floor were cattails which were anticipated to grow back in the 'wetland areas' downstream of the down-drains and drain outlets into the basin.

**STATUS REPORT, CY 2006**

1. Filled-in westerly 12-acres -

Below is a photograph depicting the new homes in the background and the westerly end of the reconfigured basin. The right-hand headwall and 90-inch diameter pipe is the downstream outlet of the storm drain system that conveys run-off to this basin. The smaller headwall and pipe on the left-hand is the upstream inlet of the storm drain system that attenuates high storm flow event and 'limits outflows to the downstream storm drain system. The rectangular concrete frame and grate visible just above and between the two headwalls is the 'spillway' for high storm flow event.



2. Deepened, reconfigured 20-acre basin -

Below is a portion of a 2003 aerial photo of the reconfigured basin. The numbers denote locations of down drains where water flows into the basin for percolation (also used as designated photo stations)



In compliance with the 1601 Permit provisions, Item No. 13, as well as the requirements of the USA-Corps of Engineers Permit, Item No. 2, maintenance activities for the basin were done in a phased manner that results in at least one third of the basin to remain vegetated and undisturbed for at least three (3) years; and allow for retention and establishment of wetland habitat.

Due to concerns about West Nile Virus, the San Bernardino County Dept. of Health Services, Vector Control Division has required the City of Upland to conduct maintenance work on the water ponds within the basin annually; we have collaborated with them to address their concerns and control mosquito breeding, while at the same time meeting compliance with the DFG and USA-COE permits.

## WETLAND MITIGATION - CURRENT CONDITIONS, E/O CY 2006

The following are recent photographs of the areas where water flows into the basin, to depict the re-establishment of wetlands within the basin –

1. West end, storm drain headwall and outlet - showing the outfall of the 90-inch RCP main drain. Also note the downdrain on the north slope that conveys run-off from the golf course drainage systems. The 'wet area' downstream of these two drains is estimated to be 0.25 acres. **(Photo Station 5)**



2. Closer view of the outfall from the 90-inch drain, showing the pond of water from street run-off. **(Photo station 6)**




3. A view of the down drain from the by-pass channel bisecting the Upland Hills Golf Course, just east of the bend at the middle third (central area of the reconfigured basin). The 'wet' areas at this location are measured at 0.53 acres. **(Photo Station 4)**



4. A closer look of the grouted riprap downdrain and pond down slope of the drain that was deepened so "larvae-eating fish" could be introduced, as a vector control measure for the West Nile Virus concerns . **(Photo Station 4)**







5. Another downdrain closer to the eastern third of the basin which together with two other drain outlets convey runoff to the easterly 1/3 of the basin. **(Photo Station 3)**

6. The two (2) down drains at the east end of the basin, one from the golf course to the north and the other from a residential street (Del Prado Rd) to the east. Note the vegetative growth at the slopes **(Photo Station 2)**



7. The area immediately downstream of the northeast corner downdrain emptying into the basin for the east end of the golf course, with shallow ponds immediately downgradient of the storm drain outlets. **(Photo Station 1)**



8. The picture of the same location but continuing westerly to show the extent of 'wet areas' and vegetative growth at the basin floor. **(Photo Station 1)**



9. A portion of a recent aerial photo of the basins showing the eastern third of the basin and the approx 2.2 acres of 'wet' areas resulting from water flow and percolation into the basin.



Due to the unseasonably dry winter during CY 2006, there has been very little water flow into the basins. Notwithstanding the dry conditions, the pictures show that the limited wetland habitat at the eastern sector have been re-established as a result of flows from drainage systems at the adjacent golf course and surrounding tributary areas served by the City storm drain systems.

## VEGETATION AND WILDLIFE HABITAT

The 1998 LSA Biological Assessment report characterized the vegetation of the basin into two categories; upland and wetland.

Wetland vegetation is restricted to those portions of the basin where water stand for some extended periods. Photos of the wetland vegetation were already depicted in the previous photos under the heading 'Wetland Mitigation'.

The upland vegetation covers the basin slopes and the parts of the basin where limited water was present.

The following pictures show the extent of regrowth of vegetative cover on the slopes as of the end of calendar year 2006.

10. The left-hand (foreground) of the picture depicts the north facing slope of the south berm. Note the dried-out shrubs. **(Photo station 2)**



The south facing slope (background) show more live 'green' vegetation, owing to the effect of the watering and irrigation from the adjacent golf course . **(Photo station 2)**

11. A closer view of the south facing slope shows shrubs, and small saplings. It should be apparent from this picture that the vegetation on the north slopes has been re-established. (Photo Station No. 3).



## ASSESSMENT OF MITIGATION EFFORTS

a) Wetlands Mitigation –

The 1.2 acres lost from the westerly 12 acres that was filled in was to be mitigated by the creation of 1.8 acres downstream of the outlet of the 90-inch storm drain at the western end of the reconfigured basin. Unfortunately due to the unseasonably dry winter for this past year, the 'wet' areas occupied only approximately 0.25 acres as of this report date.

The 'wet' areas in the bottom of the 20-acre basin were measured as follows –

- West end, 90-inch storm drain outlet (Photo stations, 5 and 6) — 0.25 ac.
- Central portion, Bypass channel out (Photo station 4) — 0.53 ac.
- Eastern third, downstream of 3 drains (Photo stations 3, 2 and 1) — 2.20 ac

The total area of the basin bottom is approximately 8 acres, and was configured to allow for the retention and percolation of water flows from the storms that feed into the basin. With favorable conditions, wetland habitat and function can be restored to pre-CY 2000 levels with run-off and storm flows into the basin.

b) Vegetation and Wildlife Habitat –

The upland vegetation covering the slopes of the south levee are typically 'abated' during summer to mitigate the fire hazards to the adjacent residential homes from dry brush. However on the north slope adjacent to the golf course, very little if, any abatement activity was conducted since the completion of the CY 2000 construction, resulting in better vegetative cover, shrubs and sapling growth.

The slope areas facing the basin available for 'upland' vegetation -

a. north facing slope along the south levee,
b. the east facing slope along the western limits of the basin
c. the west facing slope on east end and
d. south facing slope adjoining the golf course ,

have an aggregate area of approximately 10.5 acres.

**PLANNED PHASED-MAINTENANCE ACTIVITY, 2007**

In compliance with Item 10 of the Agreement, the City of Upland will not undertake any maintenance activity within the basin floor during the period from March to August 2007. The only vegetation control activity that might be undertaken would involved clearing of dry brush and dried-out vegetation from the slopes of the basin (not on the basin floor), and only to mitigate potential fire hazards that may ensue during the upcoming dry summer season.

This report was prepared in compliance with Item 14 of the Agreement.

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End of Report

Environmental Division
Department of Public Works
City of Upland

List of Birds (April 10, 11, 12, 2020):

15th Street Flood Control Basin
Upland, San Bernardino Co., California, US

This list is the result of surveys conducted by participating parties over April 10, 11, 12, 2020. The number at the end of a given species name represents the largest quantity of a given species observed during this timeframe. Please note that this is a cumulative list for only 3 days, and not every species was observed on all three days. Therefore, this list does not reflect all possible avian species on the site at any given time, and it does not preclude the presence of others including such sensitive species as the burrowing owl *(species of special concern)*, coastal California gnatcatcher *(threatened),* or least Bell's vireo *(endangered).*

In addition to the avian species below, the presence of frogs (heard chirping), various lizards, cottontail rabbits, ground squirrels, and coyotes were also observed on the site.

**41 bird species**.

Mallard (Anas platyrhynchos) 5
Mourning Dove (Zenaida macroura) 6
Anna's Hummingbird (Calypte anna) 12
Allen's Hummingbird (Selasphorus sasin) 10
Great Egret (Ardea alba) 1
Black-crowned Night-Heron (Nycticorax nycticorax) 1
Cooper's Hawk (Accipiter cooperii) 1
Red-tailed Hawk (Buteo jamaicensis) 3
Nuttall's Woodpecker (Dryobates nuttallii) 1
Pacific-slope Flycatcher (Empidonax difficilis) 1
Black Phoebe (Sayornis nigricans) 1
Ash-throated Flycatcher (Myiarchus cinerascens) 2
Cassin's Kingbird (Tyrannus vociferans) 3
California Scrub-Jay (Aphelocoma californica) 2
American Crow (Corvus brachyrhynchos) 5
Bushtit (Psaltriparus minimus) 18
Ruby-crowned Kinglet (Regulus calendula) 1
Bewick's Wren (Thryomanes bewickii) 5
House Wren (Troglodytes aedon) 1
Northern Mockingbird (Mimus polyglottos) 4
House Sparrow (Passer domesticus) 2

House Finch (Haemorhous mexicanus) 3
Pine Siskin (Spinus pinus) 2
Lesser Goldfinch (Spinus psaltria) 4
White-crowned Sparrow (Zonotrichia leucophrys) 22
Song Sparrow (Melospiza melodia) 1
Lincoln's Sparrow (Melospiza lincolnii) 1
Chipping Sparrow (Spizella passerina) 2
California Towhee (Melozone crissalis) 7
Spotted Towhee (Pipilo maculatus) 1
Hooded Oriole (Icterus cucullatus) 3
Orange-crowned Warbler (Leiothlypis celata) 4
Nashville Warbler (Leiothlypis ruficapilla) 2
Common Yellowthroat (Geothlypis trichas) 1
Yellow-rumped Warbler (Setophaga coronata) 2
Black-headed Grosbeak (Pheucticus melanocephalus) 2
American Kestrel (Falco sparverius) 1
Great Blue Heron (Ardea herodias) 1
Turkey Vulture (Cathartes aura) 5
Killdeer (Charadrius vociferus) 1
Western Bluebird (Sialia mexicana) 2

# List of Plants:

*15th Street Flood Control Basin*
*Upland, San Bernardino Co., California, US*

This is list is the result of greatly **limited surveys** conducted over April 10, 11, 12, 2020. The surveys were conducted prior to bulldozing which occurred on May 14 and 15, 2020.

This is not a comprehensive list of plant species on the site. Many more species are present than were able to be identified by participating parties.

**32 plant species:**

- Mule-Fat: Baccharis salicifolia
- Common (Seep) Monkeyflower: Mimulus guttatus
- California Sagebrush: Artemisia californica
- Jimsonweed: Datura Stramonium
- Black Sage: Salvia mellifera
- California Buckwheat: Eriogonum fasciculatum
- Buckwheat: Erigonum sp (possible additional buckwheat species)
- Deerweed: Acmispon glaber
- Hollyleaf Cherry: Prunus ilicifolia
- Scale Broom (Lepidospartum squamatum)
- California Croton: Croton californicus
- Common Fiddleneck: Amsinckia intermedia
- California Poppy: Eschscholzia californica
- Royal Penstemon: Penstemon spectabilis
- California Sun Cups: Camissoniopsis bistorta
- Wild Radish: Raphanus raphanistrum
- Watercress: Nasturtium officinale
- Yerba Santa: Eriodictyon californicum
- Tree Tobacco: Nicotiana glauca
- White Nightshade: Solanum americanum
- Coyote Melon: Cucurbita foetidissima
- California Sycamore: Platanus racemosa
- Coast Live Oak: Quercus agrifolia
- Fan Palm: Washingtonia sp.
- Brome grass: Bromus sp.
- Lupine: Lupinus sp.
- Cattail: Typha sp.

- Thistle: Cirsium sp.
- Mustard: Brassica ssp. (more than one species)
- Prickley Pear: Opuntia sp.
- Storksbill: Erodium sp.
- Plantain: Plantago ssp. (more than one species)



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# MEMO

**To:** Friends of the Upland Wetlands

**From:** Daniel S. Cooper

**Date:** Nov. 3, 2020

**Re:** Habitat assessment, California Gnatcatcher

I report on a visit to a flood-control basin along the southern edge of Upland Hills Country Club, located just north of E. 15th St. in Upland, California. My survey was conducted between 8:00 – 10:00 AM on the morning of July 24, 2020, and conditions were ideal for a survey (mid-70s clear/calm).

## Site Description

This shallow flood control basin extends east-west between the country club greens and residential development (tract housing) on E. 15th St. (**Figure 1**). Runoff from the golf course enters through four principal drains on the north side of the basin. This basin is situated along the floodplain of Cucamonga Creek, but I did not investigate the hydrological connection between the basin and the creek.

The slopes of the basin are vegetated with coastal sage scrub/alluvial fan scrub comprised of native shrub species with scattered non-natives, while the floor of the basin is comprised of a mix of native and non-native forbs in addition to areas of the same coastal scrub. Dominant species include California buckwheat (*Eriogonum fasciculatum*) and California sagebrush (*Artemisia californica*). Areas of the basin floor support native forbs largely restricted to seasonally-moist sandy/gravelly soil locally, such as Palmer's amaranth (*Amaranthus palmeri*) and a navarretia that is likely hollyleaf navarretia (*Navarretia* cf. *atractyloides*). In areas where the drains enter, small wetlands have formed, which support freshwater marsh species such as cattails (*Typha* sp.), sandbar willow (*Salix exigua*), water smartweed (*Persicaria hydropiperoides*), and seep monkeyflower (*Erythranthe guttata*).

## Historical Context/Recent Changes

The western portion of the basin was recently scraped of its vegetation (5/14-15/20; *fide* S. Wasson), leaving deep furrows in the earth, ostensibly for "weed abatement". This activity was done to both the floor as well as the slopes of the basin, but did not remove all the root systems of all plants, and

many shrubs were vigorously re-sprouting at the time of my visit. Based on an analysis of recent-historical aerial photos (Google Earth Pro), this clearing appears to be regular along the basin floor, and occurred at least in or prior to 2007 on the north slope (i.e., nearest the golf course), but the south slopes have been left relatively intact since c. 2007 (i.e., for 13 years) (**Figures 2a** and **2b**).

**Bird/Wildlife observations**

I observed bird species that are typical of native scrub, as well as species typical of ornamental landscaping (planted street trees) in residential development, throughout southwestern California. Several species observed are typical of riparian and freshwater marsh habitat, including Blue Grosbeak (*Passerina caerulea*), Common Yellowthroat (*Geothlypis trichas*) and Song Sparrow (*Melospiza melodia*). I observed three raptor species that all likely nest locally, Red-tailed Hawk (Buteo jamaicensis), Red-shouldered Hawk (*B. lineatus*) and Cooper's Hawk (*Accipiter cooperii*).

**Suitability for California Gnatcatcher**

No **California Gnatcatcher** was observed, and based on sightings in extreme southwestern San Bernardino County (e.g., www.eBird.org, Cooper et al. 2017), it is unlikely this species would occur. It has not been recorded at the "Upland Trails" basins to the north, which support much more extensive scrub, for example. A large population is present in San Dimas (including at Bonelli Park, and nearby vic. San Dimas Canyon to the north), which is c. 10 km to the west of the site. Very small numbers (1-2 birds) have recently been documented at the North Etiwanda Preserve, which is c. 10 km northeast of the site. California Gnatcatchers are fully capable of dispersing across 10 km of unsuitable habitat (*Ibid*), so it is conceivable they could find the flood control basin; however, it is probably unlikely that a population would develop given the small size of the size and its isolation. Still, based on the presence of coastal sage scrub between known populations of the species, I would recommend that future modifications be accompanied by surveys for California Gnatcatcher since it does support vegetation favored by the species.

Another sensitive species that could utilize the site include **least Bells' Vireo** (*Vireo bellii pusillus*), a federally and state endangered songbird that frequents riparian habitat, and that can occur in fairly small patches. There are several records of least Bell's Vireo from the Upland Trails area less than a kilometer to the north (www.eBird.org). Therefore, I would recommend that future modifications be accompanied by surveys for least Bell's Vireo since it does support vegetation favored by the species.

The site could also be utilized by **Burrowing Owl** (*Athene cunniculata*), but this species requires very low, sparse vegetation, and is not known to persist in small habitat patches locally (nearest population is very large undeveloped vacant lots near the Ontario Airport, one of the last resident populations in southwestern California). Still, based on the presence of bare ground and flat land, I would recommend that future modifications be accompanied by surveys for Burrowing Owl since it does support conditions favored by the species.

**Sources cited:**

Cooper, D.S., J. Mongolo and C. Dellith. 2017. Status of the California Gnatcatcher at the northern edge of its range. Western Birds 48:124-140.

I hereby certify that the information herein is correct.



Daniel S. Cooper
President, Cooper Ecological Monitoring, Inc.
TE-100008-3

**Species list**

Observations from July 24, 2020 (D.S. Cooper)

Mallard (Anas platyrhynchos) 1 1 fly-over (female)
Mourning Dove (Zenaida macroura) 2
Costa's Hummingbird (Calypte costae) 1
Rufous/Allen's Hummingbird (Selasphorus rufus/sasin) 4
Cooper's Hawk (Accipiter cooperii) 2 ad and juv southeast corner
Red-shouldered Hawk (Buteo lineatus) 1 juv. crashing through Shamel Ash along fenceline
Red-tailed Hawk (Buteo jamaicensis) 1 soaring to north
Nuttall's Woodpecker (Dryobates nuttallii) 2
Black Phoebe (Sayornis nigricans) 3 incl. juv
Ash-throated Flycatcher (Myiarchus cinerascens) 1
California Scrub-Jay (Aphelocoma californica) 2
Oak Titmouse (Baeolophus inornatus) 1
Barn Swallow (Hirundo rustica) 2
Cliff Swallow (Petrochelidon pyrrhonota) 2
Bushtit (Psaltriparus minimus) 15
House Wren (Troglodytes aedon) 1
Bewick's Wren (Thryomanes bewickii) 6
House Finch (Haemorhous mexicanus) 20
Lesser Goldfinch (Spinus psaltria) 15
Lawrence's Goldfinch (Spinus lawrencei) 5
Chipping Sparrow (Spizella passerina) 3 Juv. seen well - flew in calling to weedy patch; small pale bill, long tail, fine streaks on chest. Distinctive seet Spizella call. Assume other two birds were also juvs which aren't unexpected in early fall.
Song Sparrow (Melospiza melodia) 1
California Towhee (Melozone crissalis) 8
Spotted Towhee (Pipilo maculatus) 1 singing along fenceline
Hooded Oriole (Icterus cucullatus) 2 pair
Brown-headed Cowbird (Molothrus ater) 1 male
Common Yellowthroat (Geothlypis trichas) 1
Western Tanager (Piranga ludoviciana) 1 flight call top of euc
Black-headed Grosbeak (Pheucticus melanocephalus) 3 family group; flew to south
Blue Grosbeak (Passerina caerulea) 1 female/juv. male flushed from marshy patch

**Figures**




Figure 1. Location (red outline). The "Upland Trails" parkland referred to in the text is visible at the top of the photo (former gravel pits).




Figure 2a. 2007 aerial photo of basin, showing cleared north slope and floor.




Figure 2b. May 2019 aerial photo of basin, showing vegetated slopes and floor, including green area where drain supports wetland vegetation.

## Contact Information

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Website: www.cooperecological.com

## Overview

Daniel S. Cooper is the author of Important Bird Areas of California (Audubon California 2004), and is an authority on California bird ecology, identification and distribution. He has a strong background in natural history and biodiversity, and has designed and managed numerous monitoring and assessment projects for a variety of clients, both in the U.S. and abroad. He is an associate editor of the journal Western Birds, and works as an independent consultant and researcher.

## Areas of Expertise

- Biological assessments for public and private lands;
- Bird and wildlife surveys, including protocol-level surveys;
- Environmental compliance (CEQA/NEPA) and monitoring

## Years of Experience

CEM, Inc.: 11 years
Audubon California: 5 years

## Education

BA/1995/Harvard University
MSc (Biogeography)/1999/UC Riverside

## Certifications

U.S. Fish and Wildlife Permit No. TE-100008-2 (Yellow-billed Cuckoo, Southwestern Willow Flycatcher, California Gnatcatcher).
CDFG Scientific Collecting Permit SC-10615 (as above; add: San Diego Cactus Wren)
USGS Master Station Banding Permit #23049 (2001-2004)

## Recent Boards

Associate Editor, Western Birds, 2014 -
Southern California Academy of Sciences, 2012 - 2015
Southern California Beach Metrics Working Group, 2009 -
Los Angeles Co. Dept. of Regional Planning - Sensitive Environmental Areas Tech. Adv. Com., 2009 - 2014.

## Teaching/Advising

California State University, Los Angeles, CA. Advisor, graduate student committee member.
Loyola Marymount Univ. (CUReS), Westchester, CA. Co-taught BIO 398 (field biology); advisor, graduate student committee member.
UCLA Extension School, Los Angeles, CA. Instructor (conservation biology and bird monitoring)
University of California, Riverside, CA. Graduate Teaching Assistant, geomorphology, natural disasters, & astronomy.

# Daniel S. Cooper

*President, Cooper Ecological Monitoring, Inc.*

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## Long-term Projects

**Griffith Park Natural History Survey**
Researched and co-authored Griffith Park Wildlife Management Plan. Supervised development of website (www.griffithparkwildlife.org; with Cartifact, Inc.). Developed first-ever study of wildlife of Griffith Park, focusing on the 2007 burn area, including plants, breeding/wintering birds, reptiles/amphibians, and bats (ongoing).

**Local Coastal Plan updates, Los Angeles Co.** Worked with County Department of Regional Planning to develop conservation & management plan for Marina del Rey's LCP update, and to inventory and map biodiversity hotspots in central Santa Monica Mountains for the L.A. Co. Coastal Zone LCP update (2009-2014).

**Baseline Bird Survey, Ballona Wetlands, Los Angeles**. Designed, organized and carried-out first major all-bird survey of entire Ballona Wetlands Ecological Reserve and adjacent lands for Santa Monica Bay; coordinated protocol-level and volunteer-led surveys for sensitive species, waterbirds, raptors, and breeding songbirds of the 500-acre site (2009-2012).

**Harvard Forest, Petersham, MA**. Visiting researcher in 2011, 2013, and 2016, studying the changes in avifauna and lepidoptera since 1993 surveys (as an undergraduate student) (ongoing).

## Selected Publications

Cooper, D.S. and A.E. Muchlinski. 2015. Recent decline of lowland populations of the western gray squirrel in the Los Angeles area of southern California. Bull. Southern California Acad. Sci. 114(1):42-53.

Bonebrake, T.C. and D.S. Cooper. 2014. A Hollywood drama of butterfly extirpation and persistence over a century of urbanization. Journal of Insect Conservation 18(4):683-692.

Cooper, D.S., L.S. Hall and A.J. Searcy. 2014. A population census of the cactus wren in Ventura County, California. Western Birds 45(1):43-56

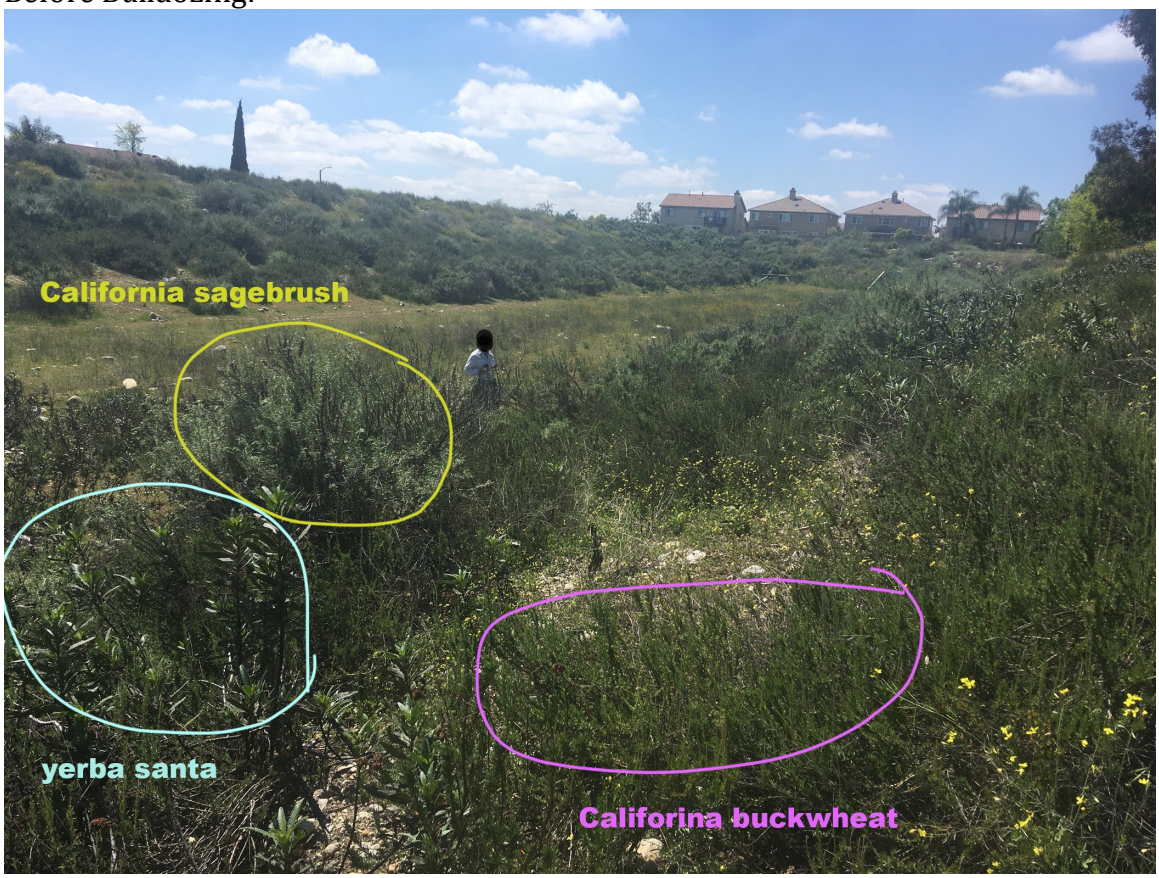
Cooper, D.S. 2012. Rare plants of Griffith Park, Los Angeles, California. Fremontia 38(4)/39(1):18-24.

---------- 2008. The use of historical data in the restoration of the avifauna of the Ballona Wetlands, Los Angeles County, California. Natural Areas Journal 28:83-90.

March 9, 2020

This document contains some photos of portions of the west side of the basin before, during, and after the first bulldozing which occurred on May 14 and 15, 2020.

Before Bulldozing:




Photos of a portion of west side of the basin, looking west. Mature coastal sage scrub habitat intact on the south, north, and west slopes. Note the California sagebrush (Artemisia californica), Yerba Santa (Eriodictyon californicum), and California Buckwheat (Eriogonum fasciculatum ) in the foreground. These plants, and others associated with coastal sage scrub habitat, such as deerweed and prickly pear are densely covering both slopes of the west side of the basin. Photo taken April 11, 2020.

Before Bulldozing:

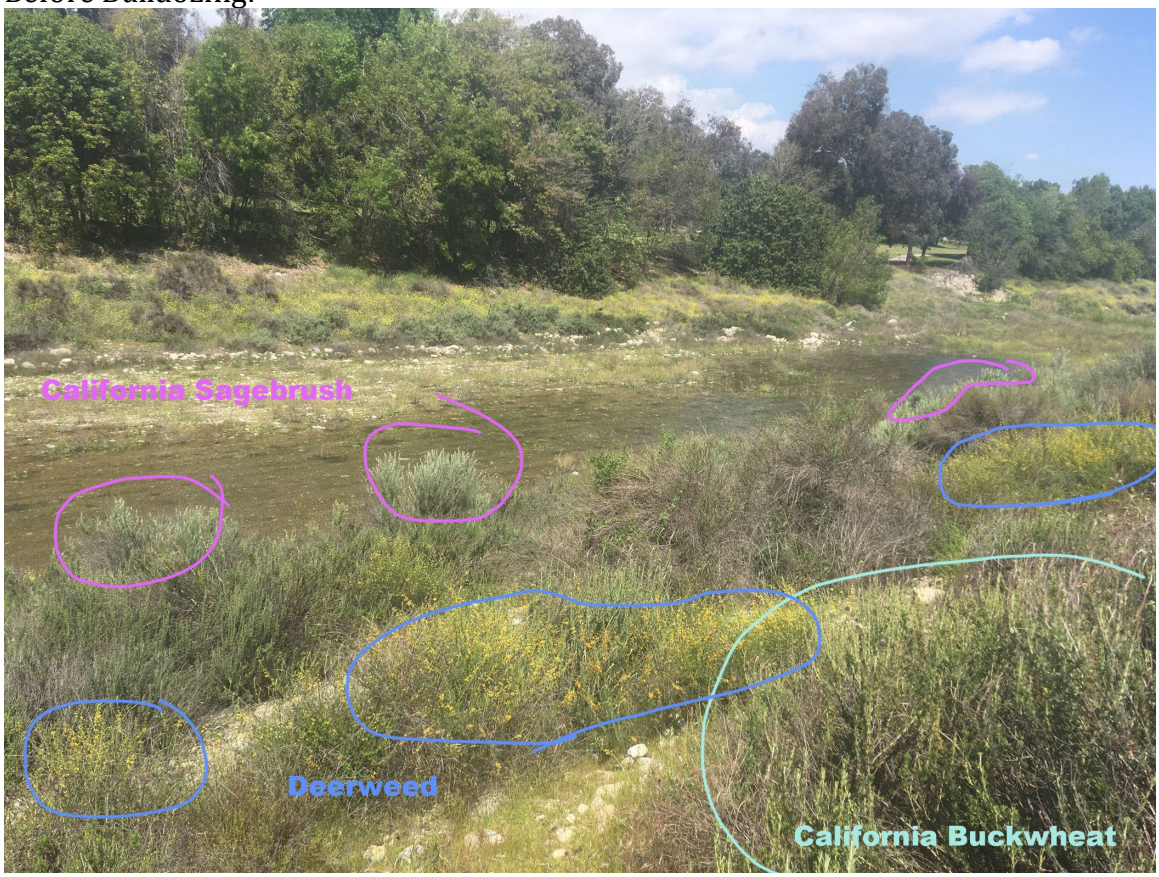



Photo of west side of basin looking northeast. Note the California sagebrush (Artemisia californica), Deerweed (Acmispon glaber) and California Buckwheat (Eriogonum fasciculatum ) in the foreground. These plants, and others associated with coastal sage scrub habitat are densely covering both north and south slopes of the west side of the basin. Photo taken April 11, 2020.

During Bulldozing:



West side of basin looking north east. South slope of basin pictured during bulldozing. Photo taken May 14, 2020.

After Bulldozing:



West side of basin looking southwest. South slope of basin pictured after bulldozing. Note mature coastal sage scrub habitat destroyed. Note wetland station #6 by drain in upper center of image. Photo taken May 15, 2020.

March 9. 2022

This document contains photos of some of the wetlands in the basin as they appeared on April 9, 2020.

I have included a screen shot of an aerial photo of the basin from the 2006 staff report on the status of the mitigated wetlands from the 1999 Streambed Alteration Agreement between the City and CDFW. This aerial photo shows numbers which correspond to drains located at specific wetlands (I have annotated this screen shot to clarify the numbers.) In the 2006 report, these numbers were used to designate 'photo stations' corresponding to each respective wetland. (Please see the 2006 staff report which is among the attachments I have sent.) In the April 2020 photos below, I have used the same numbering system to identify the respective wetlands.

I am also including a screen shot of a section of an aerial photo showing the project location, that has been provided in the NOP. Comparing the photo with the labeled wetlands from the 2006 report with the project location photo from the NOP, one can clearly see that wetlands 4, 5 and 6 fall within the footprint of the housing development, and would thus, be destroyed by the project.

Below is a portion of a 2003 aerial photo of the reconfigured basin. The numbers denote locations of down drains where water flows into the basin for percolation (also used as designated photo stations)




Page 4 of 12

Screen shot of aerial photo showing numbered wetland stations.



Screen shot of aerial photo of the project location (from NOP).


Wetland corresponding to photo station #3 (drain seen at upper left). Photo taken April 9, 2020.




Wetland corresponding to photo station #4. Water dependent plant species (hydrophytes) identified: watercress, cattails, seep monkey flower. Photo taken April 9, 2020.



Wetland corresponding to photo station #5. Drain of photo station #6 visible to the upper left. Intact sage scrub habitat visible on slopes. Photo taken April 9, 2020.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA E-MAIL: March 8, 2022

jwinter@uplandca.gov
Joshua Winter, Associate Planner
City of Upland, Development Services Department
460 North Euclid Avenue
Upland, California 91786

**Notice of Preparation of a Draft Environmental Impact Report for the Villa Serena Specific Plan (Proposed Project)**

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. Our comments are recommendations on the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (EIR). Please send a copy of the Draft EIR upon its completion and public release directly to South Coast AQMD as copies of the Draft EIR submitted to the State Clearinghouse are not forwarded. **In addition, please send all appendices and technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all emission calculation spreadsheets, and air quality modeling and health risk assessment input and output files (not PDF files). Any delays in providing all supporting documentation for our review will require additional review time beyond the end of the comment period.**

**CEQA Air Quality Analysis**

Staff recommends that the Lead Agency use South Coast AQMD's CEQA Air Quality Handbook and website[1] as guidance when preparing the air quality and greenhouse gas analyses. It is also recommended that the Lead Agency use the CalEEMod[2] land use emissions software, which can estimate pollutant emissions from typical land use development and is the only software model maintained by the California Air Pollution Control Officers Association.

South Coast AQMD has developed both regional and localized significance thresholds. South Coast AQMD staff recommends that the Lead Agency quantify criteria pollutant emissions and compare the emissions to South Coast AQMD's CEQA regional pollutant emissions significance thresholds[3] and localized significance thresholds (LSTs)[4] to determine the Proposed Project's air quality impacts. The localized analysis can be conducted by either using the LST screening tables or performing dispersion modeling.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road

[1] South Coast AQMD's CEQA Handbook and other resources for preparing air quality analyses can be found at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook.
[2] CalEEMod is available free of charge at: www.caleemod.com.
[3] South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.
[4] South Coast AQMD's guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips, and hauling trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers and air pollution control devices), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, emissions from the overlapping construction and operational activities should be combined and compared to South Coast AQMD's regional air quality CEQA ***operational*** thresholds to determine the level of significance.

If the Proposed Project generates diesel emissions from long-term construction or attracts diesel-fueled vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment[5].

In the event that implementation of the Proposed Project requires a permit from South Coast AQMD, South Coast AQMD should be identified as a Responsible Agency for the Proposed Project in the Draft EIR. The assumptions in the air quality analysis in the EIR will be the basis for evaluating the permit under CEQA and imposing permit conditions and limits. Questions on permits should be directed to South Coast AQMD's Engineering and Permitting staff at (909) 396-3385.

**Mitigation Measures**

In the event that the Proposed Project results in significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized to minimize these impacts. Any impacts resulting from mitigation measures must also be analyzed. Several resources to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project include South Coast AQMD's CEQA Air Quality Handbook[1], South Coast AQMD's Mitigation Monitoring and Reporting Plan for the 2016 Air Quality Management Plan[6], and Southern California Association of Government's Mitigation Monitoring and Reporting Plan for the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy[7].

South Coast AQMD staff is available to work with the Lead Agency to ensure that air quality, greenhouse gas, and health risk impacts from the Proposed Project are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov.

Sincerely,

*Lijin Sun*

Lijin Sun
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
SBC220217-04
Control Number

[5] South Coast AQMD's guidance for performing a mobile source health risk assessment can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.
[6] South Coast AQMD's 2016 Air Quality Management Plan can be found at: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2017/2017-mar3-035.pdf (starting on page 86).
[7] Southern California Association of Governments' 2020-2045 RTP/SCS can be found at: https://www.connectsocal.org/Documents/PEIR/certified/Exhibit-A_ConnectSoCal_PEIR.pdf.

# NATIVE AMERICAN HERITAGE COMMISSION

Governor's Office of Planning & Research

Feb 11 2022

STATE CLEARING HOUSE

February 8, 2022

Joshua Winter, Associate Planner
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

**Re: 2022020150, Villa Serena Specific Plan Project, San Bernardino County**

Dear Mr. Winter:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

**Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws**.

CHAIRPERSON
**Laura Miranda**
*Luiseño*

VICE CHAIRPERSON
**Reginald Pagaling**
*Chumash*

PARLIAMENTARIAN
**Russell Attebery**
*Karuk*

SECRETARY
**Sara Dutschke**
*Miwok*

COMMISSIONER
**William Mungary**
*Paiute/White Mountain Apache*

COMMISSIONER
**Isaac Bojorquez**
*Ohlone-Costanoan*

COMMISSIONER
**Buffy McQuillen**
*Yokayo Pomo, Yuki, Nomlaki*

COMMISSIONER
**Wayne Nelson**
*Luiseño*

COMMISSIONER
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**NAHC HEADQUARTERS**
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NAHC.ca.gov

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

**1.** Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

**2.** Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

**3.** Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

**4.** Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

**5.** Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

**6.** Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

**7.** Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

**a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

**b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

**8.** Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

**9.** Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

**10.** Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

**a.** Avoidance and preservation of the resources in place, including, but not limited to:

**i.** Planning and construction to avoid the resources and protect the cultural and natural context.

**ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

**b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

**i.** Protecting the cultural character and integrity of the resource.

**ii.** Protecting the traditional use of the resource.

**iii.** Protecting the confidentiality of the resource.

**c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

**d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).

**e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

**f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

**11.** Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

**a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

**b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

**c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

**1.** Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).

**2.** No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.

**3.** Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).

**4.** Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:

- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

**1.** Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:

- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

**2.** If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

**3.** Contact the NAHC for:

**a.** A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

**b.** A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

**4.** Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

**a.** Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

**b.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

**c.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,



Andrew Green
Cultural Resources Analyst

cc: State Clearinghouse

## BILL RODSTROM

Comments focus on threatened species, flood control capacity, nature deficit disorder, and wetlands, and provides mitigation suggestions.

- **Threatened Species**
  - ***California Gnatchers:*** There was a small but suitable coastal sage scrub habitat that favored California Gnatcatchers. This bulldozed habitat must be allowed to grow back to see if gnatchers will return.
  - ***Least Bell's Vireos:*** Wetland habitats were destroyed. Least Bell's Vireos may have been using this area.
  - ***Burrowing Owls:*** On-site habitat must be allowed to return to see if Burrowing Owls will use the site for nesting purposes.

- **Flood Control Capacity**
  - The flood control basin, as designed, sufficiently stores stormwater runoff from heavy rainfall events in the area (up to 3-4 feet). A more severe or prolonged storm, or a much smaller basin would presumably fill the basin even higher.

  - **Nature Deficit Disorder**
    - The flood control basin is the only wildland within a half a mile of radius. It has been found to be rich in wild species of native plants, birds, reptiles, and many insects like native butterflies, bees, and dragonflies.
    - It provides an opportunity to explore nature and learn about biodiversity, a quality that is not provided by nearby parks due to being full of non-native trees and lawns.

- **Wetlands**
    - Geotechnical report stated there was no surface water on site, but there have been three small wetland ponds from year-round runoff with wetland species like Willows (Salix), cattails (Typha), watercress (Nasturtium), etc., and associated breeding dragonflies, mallards and other wetland-dependent species.
    - Mr. Rodstrom observed a four-foot-wide stream of water pouring through roughly 8 ft. diameter culverts on the west end of the proposed development. Questions the source of water and where it will be diverted to.

- **Mitigation**
  - Since this project will remove over nine acres of Sage Scrub native habitat, he recommends that all tree, shrub, and perennial plant landscaping be composed of California native plants to accommodate for native species.
  - Best use for the 15$^{th}$ Street Flood Control Basin is to allow it to grow back as an important bit of southern coastal sage scrub rather than to develop

## CALIFORNIA FISH AND WILDLIFE

Comments focus on issues of concern regarding the CDFW.

- **Scope of Authority**
    - Project may be subject to CDFW's lake and streambed alteration regulatory authority
    - Project may result in takings as defined by State law under the California Endangered Species Act (CESA), thus applicant may seek take authorization
- **Assessment of Biological Resources**
    - For adequate review and comment on the project by CDFW, the DEIR should include a complete assessment of flora and fauna within and adjacent to the Project footprint, with particular emphasis on identifying rare, threatened, endangered, and other sensitive species and associated habitat.
        - Assessment of various habitat types located within the footprint, and a map that identifies the location of each habitat type; recommends *The Manual of California Vegetation*, second edition (Sawyer et al. 2009). Adjoining habitat areas should be included in the assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.
        - General bio inventory of fish, amphibian, reptile, bird, and mammal species that are present or have the potential to be present within each habitat type onsite and within adjacent areas that could be affected by the project. The *California Natural Diversity Database* (CNDDB) should be contacted to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code, in the vicinity of the proposed Project. Notes that the CNDDB is not exhaustive and should be used as a starting point.
        - A complete and recent inventory of rare, threatened, endangered, and other sensitive species located within the Project footprint and within offsite areas with the potential to be affected, including CSSC and State Fully Protected Species, including those that meet the CEQA definition (15380). Should address seasonal variations in use and should not be limited to resident species. Focused species-specific surveys, with all proper credentials and protocol, are required. Acceptable procedures should be developed with consultation with CDFW and USFWS, when necessary. Some aspects of the proposed Project may warrant periodic updated surveys for certain sensitive taxa, particularly if the Project is proposed to occur over a protracted time frame, or in phases, or if surveys are completed during periods of drought.
            - Potential taking of Burrowing owl is anticipated, recommends the City to follow contents provided in *Staff Report on Burrowing Owl*

*Mitigation* (DFG, March 2012), which specifies three steps for project impact evaluations.

- Thorough, recent floristic-based assessment of special status plants and natural communities, following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*
- Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region
- Full accounting of all open space and mitigation/conservation lands within and adjacent to the Project

- **Analysis of Direct, Indirect, and Cumulative Impacts to Biological Resources**
  - Suggestions on included information in the DEIR
- **Alternatives Analysis**
  - Recommendation of reasonable and feasible alternatives, including No Project
- **Mitigation Measures**
  - Suggestions on things to consider when proposing mitigation measures
    - Fully protected species
    - Sensitive Plant Communities
    - CSSC
    - Mitigation scope and scenarios
    - Habitat Revegetation and Restoration Plans
    - Nesting Birds and Migratory Bird Treaty Act
    - Moving out of Harm's Way
    - Translocation of species
- **California Endangered Species Act (CESA)**
  - Least Bell's vireo
- **Lake and Streambed Alteration Program**
  - LSA is applicable to the Project; full impact disclosure to the resources affected, and provide adequate avoidance, mitigation, monitoring, and reporting.
- **Additional comments and recommendations**
  - Recommends incorporation of water-wise concepts in project landscape design plans
  - CA Save our Water website

- **Environmental Data**
    - Information in EIR reports to be incorporated into the CNDDB database for subsequent or supplemental environmental determinations
- **Filing Fees**

## JO BEANZ

Mr Beanz's comments focus on aesthetics, increase in noise levels, reduced groundwater recharge, impacts to biological resources and endangerment of the wildlife, flora and fauna in the area.

- **Biological and Groundwater**
    - Weed abatement activity destroyed the flora, fauna, and wildlife on site by destroying the habitats and applying herbicides. Basin needs a chance to grow back to accommodate for the wildlife.
    - Water was present on site and included duck habitat before the weed abatement activity. Water was gone and a duck was found dead afterwards.

- **Aesthetics:**
    - The Villa Serena project will block the current residents' beautiful views of the flood basin and the mountains. Decrease home values in the area.

## GABRIELLENO BAND OF MISSION INDIANS - KIZH NATION

- In agreement with the Specific Plan Amendment. Would like to be notified before ground disturbance for any work in the vicinity.

## LETICIA ANDERSON

- Miss Anderson is concerned about the Project's impact on wildlife, municipal departments, and traffic which will all create undesirable living conditions and affect property values.

## LOIS SICKING

- Mr. Sicking is concerned about the project impacts to air quality, greenhouse gas emissions, aesthetics/visual, biological resources/wetlands/riparian, flood control detention basin capacity and flood control, water supply, groundwater, noise, transportation, drainage/absorption and toxic/hazardous wastes from the adjacent landfill and stormwater pollution runoff.
- Previous "weed abatement" activity utilized heavy equipment such as bulldozers and herbicides which removed all vegetation on site. Discourages the use of heavy equipment in the basin.

## NATASHA WALTON

- **Biological Resources**

- The Project must take into consideration the state of and species occupying the west side of the basin prior to bulldozing. further bulldozing activities must be prohibited on any portion of the basin.
- National Wetlands Inventory (NWI) indicates the presence of wetlands in this basin so project development will result in the loss of wetlands in the basin.
- Recommends that surveys must be conducted using agency-approved protocols for special-status species, such as the coastal California gnatcatcher, least Bell's vireo, and burrowing owl
- Surveys must be conducted throughout the year during different times of the day to evaluate the presence of the whole variety of species using the basin, such as frogs and bats.

## QUECHAN INDIAN TRIBE

- No comments

## SAN MANUEL BAND OF MISSION INDIANS – RYAN NORDNESS

- Requires consultation in the event of any and all archaeological findings.

## SAN BERNARDINO COUNTY DEPARTMENT OF PUBLIC WORKS

- Storm drains in and around the site may be impacted by the project development. Review and approval by the City is required for any alterations to existing storm drain patterns.
- Project Site lies within Zone X (outside the 500 yr. floodplain) of the FEMA Flood Insurance Rate Map. Impacts associated with the Project's occurrence in this zone must be addressed.
- The District owns the existing West Cucamonga By-Pass Channel within the scope of the Project. On-site or Off-site improvements to this area, as part of the Project, would require review and approval from the District.
- Project must identify and protect the alignment of future flood control facilities.

## SCAG

- Connect SoCal goals may be pertinent to the proposed Project. A side-by-side comparison of SCAG's Connect SoCal goals with the proposed Project's goals representing consistency or non-consistency is recommended.
- Proposed project appears to be in or near a Freshwater Pond and/or Freshwater Emergent Wetland according to the U.S. Fish and Wildlife Service National Wetlands Inventory. Connect SoCal recommends reviewing the 2020 Connect SoCal Natural and Farm & Farm Lands Conservation Technical Report for strategies to protect and enhance biodiversity, habitat, wildlife areas and agricultural areas in the SCAG region.
- For information on growth forecasts for the regional and applicable jurisdictions for years 2016 to 2045, refer to the Connect SoCal Demographics and Growth Forecast Technical Report.
- SCAG staff recommends a review of the Final Program Environmental Impact Report for Connect SoCal for guidance, as appropriate. It includes a list of project-level performance standards-based mitigation measures that may be considered for adoption and

implementation by lead, responsible, or trustee agencies in the region, as applicable and feasible.

## SHARI WASSON

Mr. Wasson's comments encourage that EIR adequately address modifications to the basin by including detailed plans covering depths, slopes, berm height changes, capacity, flood risks, access roads, planned habitat restoration, etc. for the proposed Project.

- **Biological Resources**
  - Bulldozing activity on the west side of the basin destroyed or severely damaged the native coastal sage scrub habitat and nearly all plants, including small trees and strands of prickly pear cactus.
  - Species that are regenerating after the bulldozing should be assessed, along with the small areas of habitat that remain intact on the west side of the basin.
  - East side of the basin shares some common plant and animal species as the west side which should be assessed to help inform the assessment of the west side.
  - Further bulldozing of all parts of the basin should be prohibited to prevent further damage to biological resources
  - Modifications to the east side would result in damage and destruction of coastal sage scrub habitat and wetland areas on the east side of the basin.
  - **Wetland/riparian project issue:** Plant species supported by these wetlands include cattails (Typha sp.), sandbar willow (Salix exigua), watercress (Nasturtium officinale), water smartweed (Persicaria hydropiperoides), and seep monkey flower (Erythranthe guttata, formerly classified as Mimulus guttata) that would be impacted from this project.
  - **Wetland/riparian project issue:** Wetlands on the west side of the basin which would be destroyed from the proposed development. EIR needs to address mitigation for these wetlands.
  - **Wetland/riparian project issue:** There is a presence of a list of bird species that was observed by the Biologist at the time of his visit. Some of these birds include the coastal California gnatcatcher *(threatened),* least Bell's vireo *(endangered),* and burrowing owl *(species of special concern).* Protocol surveys for these species must be conducted.
  - **Wetland/riparian project issue:** Presence of the Baja California tree frog, lizards, cottontail rabbits, ground squirrels, and coyotes in the basin. Biological assessment of these species must be conducted.
  - A fair and comprehensive biological assessment must be conducted for wetlands and wild species and should involve multiple site visits at different times of year and times of day to gain a better understanding of the biological resources on site.

## SCAQMD

- Recommends the use of SCAQMD's CEQA Air Quality Handbook, website and CalEEMod land use emissions software when preparing the greenhouse gas and air quality analyses.
- The Lead Agency must quantify criteria pollutant emissions and compare them to

SCAQMD's CEQA regional pollutant emissions significance thresholds and Localized Significance Thresholds (LSTs) to determine project's air quality impacts.

- Construction and operation related air quality impacts must be addressed in the analysis. Emissions from both phases must be combined and compared to the SCAQMD's regional air quality CEQA operational thresholds to determine the level of significance.
- If the proposed Project generates diesel emissions, then Lead Agency must perform a mobile source health risk assessment.
- If a permit is required from the SCAQMD, the SCAQMD should be identified as the Responsible Agency for this project.

# APPENDIX A-3

# PUBLIC SCOPING MEETING PRESENTATION

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# City of Upland
# **Villa Serena Specific Plan Project**
# Environmental Impact Report

Public Scoping Meeting

June 8th, 2022 | 5:00 PM

# Introduction

- **Lead Agency: City of Upland**
  - Robert D. Dalquest, Development Serv. Director
  - Joshua Winter, Senior Planner
- **Environmental Consultant: LSA**
  - Carl Winter, Associate/Project Manager
- **Applicant: The Colonies Partners, L.P.**

# Purpose of Meeting

- Present Project Information
- Explain the Environmental Review Process
- Discuss Scope and Content of the EIR
- Define the Public Input Process
- **No Decision** will be made on the Project Tonight

LSA

# Scoping Meeting

- The purpose of the scoping meeting is to discuss the scope and content of the EIR.
- The project merits and the City's decision on project will be considered at **later meetings**.
- All speakers are asked to sign in so that the City can keep a record of attendance for future notification(s).
- Speakers are encouraged to also submit their comments in writing.
- The public may submit comments electronically to: Joshua Winter at jwinter@uplandca.gov
- As appropriate, comments and information will be addressed and/or incorporated into the Draft EIR

LSA

# Scoping Meeting Agenda

- Proposed Project
- What is CEQA?
- EIR Process
- Public Comments
- Closing

# Proposed Project

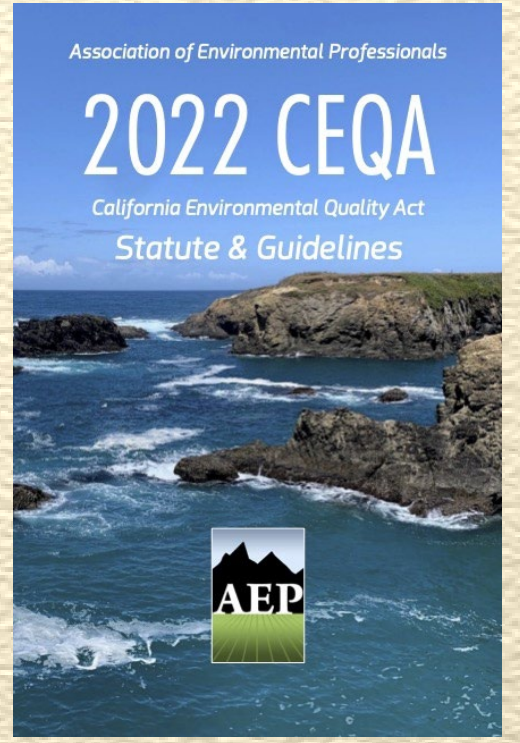
- Development of 65 homes within 9.2 acres of the existing 15th Street basin. The remaining portion of the basin will consist of 11.1 acres.
- The remaining basin will be excavated 7-feet lower than the existing basin low point to ensure that the 100-year water surface in the basin remains below the top of existing levees.
- The basin will continue to slope from the east to the west.
- The remaining 15th Street basin will continue to operate as a flood control basin to minimize and control the release of storm runoff to the meet the capacity of downstream flood control facilities.

# Proposed Project

- Connection to Campus Avenue via 15th Street to provide access to the project site.
- Installation of a ‘knuckle’ at the Fernando Avenue and 15th Street.
- Park feature located between the ‘knuckle’ and 15th Street extension.

# California Environmental Quality Act (CEQA)

- CEQA Statute: PRC §21000 et seq.
- Guidelines: “How to” for implanting statute




GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
STATE OF CALIFORNIA

LSA

# What is an Environmental Impact Report (EIR)?

- An EIR is a public disclosure document that provides objective information to inform the public and decision-makers on the potential environmental effects of the Project
- Identify potential project impacts, appropriate mitigation, and feasible alternatives to reduce potentially significant impacts
- Provide transparency during the City's decision-making process
- Provides opportunity for public review and comment on the Project
- Impact analysis and determinations are based on facts, reasonable assumptions based on facts, and expert opinion supported by fact.

# EIR Process

- Prepare Project Description
- 30-day Notice of Preparation (NOP)

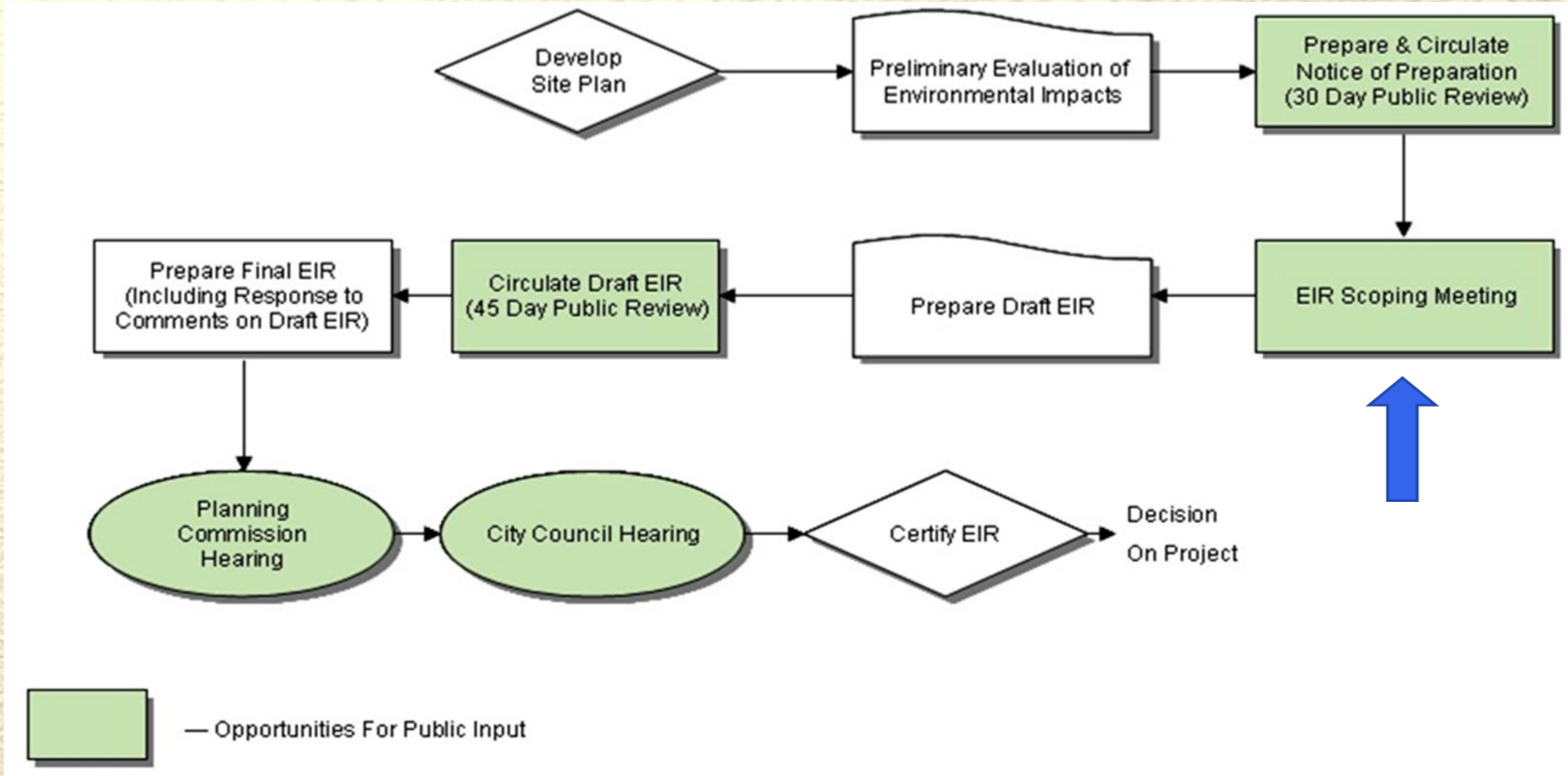
  Distributed for Public Review: February 8 to March 9, 2022.

  Comments received (13) from the public, tribal, and State/regional agencies
- Materials for the Project may be downloaded from the City's website:

  www.uplandca.gov/environmental-review
- Public Scoping Meeting
- Prepare/finalize Technical Studies (in process) and Draft EIR
- 45-day Draft EIR Public Review
- Prepare Final EIR (prepare Response to Comments, findings, etc.)
- Public Hearings/City Action on Project

LSA

# EIR Process


Develop Site Plan
Preliminary Evaluation of Environmental Impacts
Prepare & Circulate Notice of Preparation (30 Day Public Review)
EIR Scoping Meeting
Prepare Draft EIR
Circulate Draft EIR (45 Day Public Review)
Prepare Final EIR (Including Response to Comments on Draft EIR)
Planning Commission Hearing
City Council Hearing
Certify EIR
Decision On Project
— Opportunities For Public Input

# Areas of Proposed Analysis

- Aesthetics
- Air Quality
- Biological Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Noise & Vibration
- Transportation & Traffic

Also Addressed: Cumulative Effects and Project Alternatives

# Next Steps

- Prepare the Draft EIR. Comments raised during the NOP comment period and at the Public Scoping Meeting will be identified and, as appropriate, will be addressed in the Draft EIR
- As required, the Draft EIR analysis will be supported by project-specific technical studies and modeling data.
- Project impacts will be measured against established local and/or regional thresholds.
- As warranted and feasible, mitigation will be identified to reduce the level of significance of project impacts.
- The City will exercise independent judgement regarding the contents and adequacy of the Draft EIR prior to public review.

# Next Steps (continued)

- Distribute Draft EIR for Public Review and Comment (45 days)
- After closure of the review period, the City will respond to relevant concerns raised during the Public Review period.
- Responses to comments received in the Draft EIR will be made available prior to the first public hearing
- The Final EIR will be submitted to the Planning Commission for review and a decision regarding recommendation for the City Council. The City Council will provide the decision regarding acceptance of mitigation, overrides (if any), and certification of the EIR.

# Public Comments

- To facilitate later notification, please provide your name/address prior to each comment.
- Written comments may be provided in lieu of oral comments. Written comment forms have been provided and can be forwarded to:
- Joshua Winter, Senior Planner at: jwinter@uplandca.gov

***Please reference "Villa Serena" in the subject line.***

Or via mail to:

Joshua Winter, Senior Planner
City of Upland
Development Services Department/Planning Division
460 N. Euclid Avenue
Upland, CA 91786

# Thank you for your participation!

- Please sign in to facilitate notification of future project actions.
- Environmental documents are available online at:
  - https://www.uplandca.gov/environmental-review

# APPENDIX A-4

# PUBLIC SCOPING MEETING SUMMARY

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**Robert Dalquest: City of Upland**
**Joshua Winter: City of Upland**
**Carl Winter: LSA**

**Council Chamber, Upland City Hall**
**460 N Euclid Ave, Upland, CA 91786**

## SCOPING MEETING COMMENTS

### Introduction, Presentation by Carl Winter: 0-12:50

### Darell Maxey: 12:50-16:19

Comments focus on adequacy of environmental assessment methods, weed abatement activities and its effect on the integrity of environmental analysis.

- Identifies as a retired civil engineer
- Residency @ 1310 S Upland Hill Drive? (300 ft north of proposed site)
- Basis of his opposition in 2020 was that the environmental assessment of the site was flawed
  - Site conditions are different if site visits occurred during dry vs wet conditions, with wet conditions there would be more fauna and flora species active vs dry conditions
  - If assessed correctly (Site), then there would be significant impacts to biological resources
- Detention basin should not be reduced in size
- 'Records' show that the detention basin was to be reserved for wildlife, vegetation, and flood detention
- Post April 2020, some time after the IS/MND approval, observed construction equipment on the western portion of the basin stripping vegetation (and potentially scaring or taking any wildlife)
  - These events would affect any future environmental assessments of the site and should be considered in the environmental analysis
  - Unless the Project Applicant and the City waited for conditions to improve, how can a fair evaluation of biological resources at the site be done
  - For evidence, observed the events, and took video of the site when it was flooded
  - Points out that Google Earth aerial comparisons of 8/1/2021 vs 8/15/2020 shows where stripped vegetation occurred.
  - Noted that he provided photos with his letter

### Joe Hudson 16:40-24:43

Comments focus on purpose of the meeting, questions about the knuckle, questions about the wetland status of the site, and the EIR document.

- Residency @ 1335 E 15th St, 44 years
- Has observed the site in all conditions
- Questions about the purpose of the meeting
  - Confusion about the map-poster as it shows no modifications (same as original?)
- Questions about the knuckle

  - Explanation by City staff on the purpose of the knuckle, the context of why that was included in the Project, including the trail system additions (April 2020 Planning Commission hearings, and civil lawsuit explanation)
- Question about whether the State identifies the site as a wetland/registered?
- Question about whether the EIR was going to be 'seasonal'/methodology of biological professionals for analysis purposes

### Unidentified commenter: 24:43-28:35

Question about the EIR availability and the timing of the tech studies and analysis.

- Question about when the EIR would be available, and how does that coincide with the tech studies and site visits for biology
  - Explanation by Carl Winter that the EIR requires the appropriate tech studies and analysis before the EIR can be drafted, and that the timing of such reports vary, thus the absence of a definitive schedule. The methodology of (i.e. Bio) studies are specific to each analysis and the timing varies between resources areas.

### Dennise Greenberg: 28:40-32:22

Comments focus on weed abatement activities.

- Residency and property owned: 1299 Armando St and 1246 Upland Hill Dr S (both on either side of the Project site)
- Concerns of weed abatement activities, the timing of the events, and negative influence on a fair environmental assessment
- "How she does weed abatement without taking wildlife/plants"
- "Weed abatement destroys the environment"
- Question/remark on disclosure of when weed abatement activities occur, and when would site visits for environmental assessments would occur

### Joe Hudson: 32:22-34:48

Question about weed abatement activity.

- Question on why weed abatement does not occur on the entirety on the flood detention basin
  - Explanation by City staff that part of the property is privately owned, the City sends notices to property owners for weed abatement requirements; the City-owned part of the basin is under the purview of the Public Works Department, and any questions on why inactivity on that portion should be deferred to Public Works.

### Natasha Walton: 34:50-42:04

Comments focus on weed abatement concerns, basin and associated permitting, requests for certain features in the EIR, and proposed alternative.

- Identifies as a 18 year Upland resident, wildlife biologist
- Disappointed that project is occurring on one of Upland's 'last biological treasures'
- Pleased that an EIR is proceeding instead of the flawed IS/MND
    - Anticipates that there would still be significant negative impacts to biological resources
- Expresses desire for full disclosure of biological impacts even before Planning Commission even considers the Project
- Sherry Watson's request
    - Emails dated 3/9/22 and 6/8/22
    - Consider State identified species prior to weed abatement activities that have occurred in May 2020 and May 2022 on the western side of the basin
    - Concerned of whether the Property owner submitted required bird surveys prior to each weed abatement activity, would like this to be addressed in the EIR
    - Prohibit any future weed abatement on-site until project determination
    - Address the loss of wetlands and special status species (Gnatcatcher, Virio, burrowing owls)
    - Conduct surveys at various times during the year at various times of the day/night since species have different active times (frogs/bats at night)
- Request a delineation of jurisdictional waters (JD) of the entire basin
    - Concern that a combination of RWQCB's 401K, USACOE 401, and/or CDFW 1602 permitting may be necessary
    - Anticipates the need for streambed alteration (last agreement with CDFW was in 1999? Vs 2022 today)
    - Included a screenshot from the National Wetlands Inventory that indicates wetlands in the basin
    - Request that all maps in the document include the eastern side of the basin (due to modifications impacting that area as well)
- Expresses desire for EIR to address CDFW's comments from 3/27/22 letter (NOP response)
    - Comments of concern include proper protocol, species of concern, and Lake/streambed alteration
- Proposes a project alternative
    - To preserve or enhance local quality of life
    - Donation of the basin to a NPO for preservation

### Dan Russell: 42:20-44:20

Comments focus on water shortage.

- Residency @ 1498 (Not clear) Way? (by College Center)
- Alluded to Cambria, CA as an example of no water for construction
    - Explanation by City staff of the context behind Cambria's moratorium/no water meters/different geographical region
    - Additional explanation of the 5yr Urban Water Management Plan done by the City's Water Department, the plan would cover water shortage concerns related to the City

### Unidentified commenter: 44:42-46:05

Comments focus on the basin modification and scope of the impact analysis for biology.

- Question about whether the deepening of the basin will affect the slope
- Question about whether the scope of the biological impact analysis will cover the eastern part of the basin
- Question about who the contractor might be for doing the grading

### Joe Hudson: 46:11-48:35

Comments focus on private property matters and water concerns.

- Express disdain that while there is a water shortage, Project is adding more people
- Disagreement of whether the Project is worth replacing the basin which has also contributed to groundwater recharge
- Comment on Upland being a small-town, should not be like Los Angeles
- Question on whether the City can purchase the property from the Applicant

### Denise Greenberg: 48:48-50:00

Comments focus on processing proposed projects.

- Pondered why the City doesn't reject the Project/bad deal remarks
- Raised ethical concerns of the City processing the Project
- "EPA/or whoever says that the site shouldn't be developed"
- Raised question of why the Project Applicant doesn't pursue land by the railroad tracks and build condominiums

### Closing of Meeting by Robert Dalquest: 50:00-51:14

### Unidentified Commenter: 51:15-51:48

Comments focus on legality of resources presented for the scoping meeting.

- Question of whether resources provided in the meeting (the posterboard visual) is legally required
    - Explanation by City staff that it is a practice, not legally required

### Darell Maxey: 51:52-56:45

Comments focus on response to comments.

- Question of whether comments collected this around will be dismissed with the same reasonings as the prior iteration (the approval prior to the lawsuit), such as 'not pertinent'
    - Explanation by Carl Winter that responses to comments cannot be speculated on, and that response to comments then is only applicable to the information available at that time the IS/MND was prepared; response to comments today for the EIR will be only

applicable to the information available at current conditions, not from the IS/MND conditions.

- Question of air quality impacts then vs now
    - Explanation by Carl Winter that given no change in intensity of project, it can be reasoned that air quality impact discussion prior would be like the discussion done in the IS/MND. Additionally, with SCAQMD's new upcoming model, the authors of the EIR and those conducting technical reports can only adjust the parameters and not the script of the model itself. They can only check to see if the data being inserted into the model is accurate.

### Joe Beans/Joe Bolin: 56:55-1:00:20

Comments focus on biological and aesthetic impacts, and procedural related matters.

- Identifies as founder of Friends of 15th St
- Sent emails and pictures to Joshua Winter
- Loss of wildlife noises, reminiscing on early years prior to current conditions as development sprung around Upland
- Mentioned a CDFW call about weed abatement activities?
- Pictures of dead ducks after a weed abatement activity (pictures with Joe Hudson?)
- Remark on prior civil lawsuit victory
- Aesthetic concern of current dead-end environment on 15th St, comment about a nearby school, and concern of adding 65 units to the area
- Question of whether the police force can handle the addition of 65 more homes
- Concern of more development despite water shortage and conservation
- 15th St basin is one of the few left in the region that isn't concerted (mentioned Chino and Fontana?), losing a rechargeable basin
- Question of whether a traffic study was conducted
- Comment on letting the basin grow back before further action is done
- Comment on pictures of basin prior to drought
- Comment on consideration of impacts affecting the eastern part of the basin

### Actual Closing of Meeting by Carl Winter: 1:00:20-1:03:52

## COMMENTS VIA EMAIL

### Mary Ann Macias: June 6, 2022, 7:41:10 AM

Comments focus on built environment, water shortage concerns, and traffic safety.

- Assumption that the purpose of the scoping meeting is to explain the details of the project the City had already approved
- More homes in a city that is already full of dense housing
- Streets need repair, mentions Foothill, Arrow Hwy, Campus
- Comment on water conservation yet more development
- Comment on development being built near an intersection Baseline(16th) and Campus, notorious for auto accidents

### Dan Russell: Date/Time unknown

Comments focus on various post-implementation methodologies, responsible parties involved in certain activities of the project, and disclosure related concerns.

- No meeting notices have been posted on the three billboard signs on 15th St for this meeting
- Question on origins of water used for construction
- Question on who is financially liable for city water used in construction including dust abatement and accessing fire hydrants
- Question on who will monitor for potential illegal usage of fire hydrants
- If the project is to be implemented, will future home buyers be provided notice about the closed Upland dump and the methane gas associated with that site; and will they be notified about the fact that the Project is located within a flood control plain
- Question on the existence of cancer studies in the area from potential environmental health issues related to toxic gases, residual waste in the floodplain area and related wildlife habitat conditions
- Question of who will be financially liable for potential destruction to homes related to potential water runoff/flood conditions and methane gas related events
- Question of the details of the road access plan of the site; would 16th St through the SCE easement south of the power station and via the current traffic signal at the golf course be possible to reduce automobile pollution and improve road safety; this routing could present a faster route to Campus Hills shopping and access to the I-210
- Concerns of traffic rates on Grove Ave and 14th St due to utilization of WAZE to detour around Foothill
- Concern of 15th St traffic utilization, who will be financially liable for reconditioning existing access north/south streets that aren't in best conditions
- Question of the hours of construction, who is responsible for monitoring noise and dust conditions; will appropriate emergency government contact information be posted in the construction area (including wildlife protection agencies?)
- Comment on observation of probable illegal bulldozer operation last year with no dust control and no notification to proper authorities of what was being accomplished

# APPENDIX A-5

# INITIAL STUDY

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# INITIAL STUDY

## VILLA SERENA SPECIFIC PLAN PROJECT

## CITY OF UPLAND

## SAN BERNARDINO COUNTY, CALIFORNIA

LSA

October 2019

# INITIAL STUDY

# VILLA SERENA SPECIFIC PLAN PROJECT

# CITY OF UPLAND

# SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

City of Upland, Development Services Department
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LSA Project No. FTR1801

LSA

October 2019

The City of Upland has independently reviewed, analyzed, and exercised judgment in making the determinations contained herein, pursuant to Section 21082.1(c) of the California Public Resources Code, Division 13 (California Environmental Quality Act).

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AB | Assembly Bill |
| ADT | Average Daily Trip |
| amsl | above mean sea level |
| AQMP | Air Quality Management Plan |
| ASTM | American Society of Testing and Materials |
| BACM | Best Available Control Measure |
| BANL | Base Ambient Noise Levels |
| BMP | Best Management Practice |
| Btu | British thermal unit |
| CalEEMod | California Emissions Estimator Model |
| CALGreen | California Green Building Standards Code |
| CalRecycle | California Department of Resources Recycling and Recovery |
| CALUCP | Cable Airport Land Use Compatibility Plan |
| CAP | Climate Action Plan |
| CARB | California Air Resources Board |
| CBC | California Building Code |
| CBSC | California Building Standards Commission |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| CDS | continuous deflection separator |
| CEQA | California Environmental Quality Act |
| cfs | cubic feet per second |
| $CH_4$ | Methane |
| City | City of Upland |
| CIWQS | California Integrated Water Quality System |
| CNEL | Community Noise Equivalent Level |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide-Equivalent Gases |
| dBA | A-weighted decibels |
| DCV | Design Capture Volume |
| DIF | Development Impact Fee |
| DPR | Department of Parks and Recreation |
| DR | Design Review |
| DTSC | (California) Department of Toxic Substances Control |
| EAR | Environmental Assessment Review |
| EIR | Environmental Impact Report |

| | |
|---|---|
| EPA | (United States) Environmental Protection Agency |
| ESA | Environmental Site Assessment |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FMMP | Farmland Mapping and Monitoring Program |
| $ft^3$ | cubic feet |
| FTA | Federal Transit Administration |
| GHG | Greenhouse Gas |
| GPA | General Plan Amendment |
| GPCD | gallons per capita per day |
| gpd | gallons per day |
| GWh | Gigawatt-hour |
| HPLV | High Pressure Low Volume |
| HUD | (United States Department of) Housing and Urban Development |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IEUA | Inland Empire Utilities Agency |
| IS | Initial Study |
| ITE | Institute of Transportation Engineers |
| kWh | Kilowatt-hour |
| LF | linear feet |
| LID | Low Impact Development |
| LOS | Level of Service |
| LST | Localized Significance Threshold |
| MBTA | Migratory Bird Treaty Act |
| mgd | million gallons per day |
| MLD | Most Likely Descendant |
| MND | Mitigated Negative Declaration |
| MPO | Metropolitan Planning Organization |
| MRZ | Mineral Resource Zone |
| MS4 | Municipal Separate Storm Sewer System |
| MT | Metric Ton |
| MWD | Metropolitan Water District |
| $N_2O$ | nitrous oxide |
| NAHC | Native American Heritage Commission |
| ND | Negative Declaration |
| NDDB | Natural Diversity Data Base |
| NOI | Notice of Intent |
| NOx | Nitrogen Oxides |

| | |
|---|---|
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resource Conservation Service |
| $O_3$ | Ozone |
| $PM_{10}$ | Particulate Matter less than 10 microns in size |
| $PM_{2.5}$ | Particulate Matter less than 2.5 microns in size |
| PPV | peak particle velocity |
| RCB | round catch basin |
| RCP | reinforced concrete pipe |
| RHNA | Regional Housing Needs Assessment |
| RPS | Renewable Portfolio Standards |
| RTP | Regional Transportation Plan |
| RWQCB | Regional Water Quality Control Board |
| SAWCo | San Antonio Water Company |
| SB | Senate Bill |
| SBCFD | San Bernardino County Fire District |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| SCCIC | South Central Coastal Information Center |
| SCS | Sustainable Communities Strategy |
| SLF | Sacred Lands File |
| SMBMI | San Manuel Band of Mission Indians |
| SOx | Sulfur Oxides |
| SP | Site Plan |
| SPR | Specific Plan |
| SRA | Source Receptor Area |
| SRRE | Source Reduction and Recycling Element |
| SWPPP | Storm Water Pollution Prevention Plan |
| SWRCB | State Water Resources Control Board |
| TIA | Traffic Impact Analysis |
| TT | Tentative Tract |
| UPD | Upland Police Department |
| USDA | United States Department of Agriculture |
| USDOT | United States Department of Transportation |
| USGS | United States Geological Survey |
| UWMP | Urban Water Management Plan |
| VdB | velocity in decibels |
| VMT | Vehicle Miles Traveled |
| VOC | Volatile Organic Compounds |

| | |
|---|---|
| WDIN | Waste Discharge Identification Number |
| WFA | Water Facilities Authority |
| WQMP | Water Quality Management Plan |
| ZC | Zone Change |

# 1.0 INTRODUCTION AND PURPOSE

## 1.1 INTRODUCTION

Section 1.0 of this Initial Study (IS) describes the purpose, environmental authorization, the intended uses of the IS, documents incorporated by reference, and the processes and procedures governing the preparation of the environmental document. Pursuant to Section 15367 of the State of California *Guidelines for Implementation of the California Environmental Quality Act* (*CEQA Guidelines*), the City of Upland (City) is the Lead Agency under the California Environmental Quality Act (CEQA). The City has primary responsibility for compliance with CEQA and consideration of the proposed Villa Serena Specific Plan Project (Project or Proposed Project).

The IS is organized as follows:

*Section 1.0* *Introduction and Purpose* provides a discussion of the Initial Study's purpose, focus, legal requirements.

*Section 2.0* *Project Description* provides a detailed description of the Proposed Project.

*Section 3.0* *Initial Study Checklist and Responses* includes a checklist and accompanying analyses of the Project's effect on the environment. For each environmental issue, the analysis identifies the level of the Project's environmental impact.

*Section 4.0* *References* provides a list of references cited in the body of the document.

*Appendices* Includes the technical material prepared to support the analyses contained in the Initial Study.

## 1.2 PURPOSE

The discretionary land use entitlements associated with the Project include Site Plan (SP) No. 18-10, Design Review (DR) No. 18-14, General Plan Amendment (GPA) No. 18-04, Zone Change (ZC) No. 18-04 Tentative Tract (TT) 18-03, Specific Plan (SPR) 18-02 and Environmental Assessment Review (EAR No. 0700 for an Initial Study/Mitigated Negative Declaration for approval and adoption by the City of Upland, respectively. Because of these discretionary actions to be considered by the City, CEQA requires that the Proposed Project be reviewed to determine the environmental effects that would result if the Project were approved and implemented. The City is the Lead Agency and has the responsibility for preparing and adopting the associated environmental document prior to consideration of the approval of the Proposed Project. The City has the authority to make decisions regarding discretionary actions relating to implementation of the Proposed Project.

This IS has been prepared in accordance with the relevant provisions of CEQA (California Public Resources Code Section 21000 et seq.); the *CEQA Guidelines,*[1] and the rules, regulations, and procedures for implementing CEQA as adopted by the City. The objective of the Initial Study is to inform City decision-makers, representatives of other affected/responsible agencies, and the public and interested parties of the potential environmental consequences of the Project.

As established in *CEQA Guidelines* Section 15063(c), the purposes of an IS are to:

[1] California Code of Regulations, Title 14, Chapter 3, Sections 15000 through 15387.

- Provide the Lead Agency (i.e., the City of Upland) with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR), Negative Declaration (ND); or Mitigated Negative Declaration (MND);
- Enable an Applicant or Lead Agency to modify a Project, mitigating adverse impacts before an EIR is prepared, thereby enabling the Project to qualify for an ND or MND;
- Assist in the preparation of an EIR, if one is required;
- Facilitate environmental assessment early in the design of a Project;
- Provide a factual basis for finding in an ND or MND that a Project will not have a significant effect on the environment;
- Eliminate unnecessary EIRs; and
- Determine whether a previously prepared EIR could be used with the Project.

## 1.3 AUTHORIZATION

According to Section 15002(b) of the *CEQA Guidelines*, the basic purposes of CEQA are:

- Inform government decision-makers and the public about the potential significant environmental effects of proposed activities;
- Identify ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in Projects through the use of alternatives or mitigation measures when the governing agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the Project in the manner the agency chose if significant environmental effects are involved.

## 1.4 INTENDED USE OF THIS INITIAL STUDY

The City formally initiated the environmental process for the Project with the preparation of this IS. The IS screens out those impacts that would be less than significant and that do not warrant mitigation, while identifying those issues that require mitigation to reduce impacts to a less than significant level. As identified in the following analyses, Project impacts related to various environmental issues either do not occur, are less than significant (when measured against established significance thresholds), or have been rendered less than significant through implementation of mitigation measures. Based on these analytical conclusions, this IS supports adoption of an MND for the Proposed Project.

CEQA[2] permits the incorporation by reference of all or portions of other documents that are generally available to the public. The IS has been prepared utilizing information from the City of Upland planning and environmental documents, technical studies specifically prepared for the Project, and other publicly available data. The documents utilized in the IS are identified in Section 3.0 and are hereby incorporated by reference. These documents are available for review at the City of Upland, Development Services Department.

[2] *CEQA Guidelines* Section 15150.

## 1.5 PUBLIC REVIEW OF THE INITIAL STUDY

The IS and a Notice of Intent (NOI) to adopt an MND will be distributed to responsible and trustee agencies, other affected agencies, and other parties for a 20-day public review period. Written comments regarding this IS should be addressed to:

Joshua Winter
Associate Planner, Planning Division
City of Upland, Development Services Department
460 N. Euclid Avenue
Upland, California 91785
(909) 931-4143
jwinter@ci.upland.ca.us

After the 30-day public review period, consideration of comments raised during the public review period will be taken into account and addressed prior to adoption of the MND by the City.

## 1.6 LIST OF PREPARERS

### 1.6.1 City of Upland

Joshua Winter
Associate Planner
City of Upland, Development Services Department

### 1.6.2 LSA Associates, Inc.

Lynn Calvert-Hayes, AICP, Principal in Charge
Carl Winter, Associate/Project Manager
Dionisios Glentis, Environmental Planner
Steven Dong, Senior Editor
Meredith Canterbury, Senior GIS/Graphics Specialist
Maria Perez, Administrative Assistant/Document Production

# 2.0 PROJECT DESCRIPTION

## 2.1 OVERVIEW

The Villa Serena Specific Plan is a proposal by Frontier Communities (Applicant) to develop a gated residential community on approximately 9.2 acres (Site or Project Site) located north of 15th Street and approximately 0.25 mile east of North Campus Avenue in the City of Upland (City) (Figure 1).

The Site is an infill site surrounded by single-family residential uses to the south and west, the Upland Hills Country Club and residential community to the north, and residential uses to the east. A Southern California Edison substation is located northwest of the Site. The Project consists of the development of 65 single-family detached residential units at a density of 7.1 dwelling units per acre and on-site active and passive recreational amenities to be provided within the common area open space.

The proposed development envisions single-family housing styles common to those traditionally found in the City. The Site's architecture, influenced and inspired by Spanish, Italianate, and French Country styles, echoes the classic architecture of the Southern Californian region. The Project integrates styles, elements, and a mix of materials from both established and newer residential communities located near the Site. The residential units have been designed to reflect the massing and scale of existing neighboring homes by using similar proportions, heights, and footprints allowing for the new community to comfortably blend with the existing neighborhood and the community at large.

Construction of Project roadways and infrastructure is planned to connect to existing facilities located adjacent to the Site. The Proposed Plan utilizes existing circulation and transportation facilities reducing the need for construction of additional arterial and major roadway extensions or improvements to serve the Site. The Site is within walking and biking distance to existing recreational and commercial facilities, which can help reduce automobile trips. Sierra Vista Park and Upland Memorial Park are located approximately 0.5 mile west and 0.8 mile south of the Site, respectively. The Colonies Crossroads Center, providing grocery, restaurants, personal services, entertainment, and home goods, is located within approximately one mile north of the Site.[3] A commercial center, including a Walmart Neighborhood Market, is located on Foothill Boulevard, approximately 0.75 mile south of the Site.

## 2.2 PROJECT LOCATION AND EXISTING SETTING

The Project Site constitutes a portion of a the existing 15th Street flood control detention basin which is bounded by residential uses and the Upland Hills Country Club on the north, and single-family residential uses on the east, west, and south (Figure 2). The City has determined the 9.2-acre portion of the flood control detention basin comprising the Site to be a surplus parcel. The remaining 11.1 acres of the flood control detention basin as adequate for continued flood control operations pursuant to completion of modifications to portions of the basin made as part of the Project. Maintenance access for the flood control facilities will be provided by a gated entry to the basin located at the eastern edge of the Site. Table 2.2A shows the Proposed Project surrounding land uses, General Plan and zoning designations.

[3] Via 15th Street, Alta Avenue, 14th Street, and Campus Avenue, travel distance to this center is approximately 2.0 miles.

**Table 2.2A: Surrounding Land Uses and Project Setting**

| Direction | Existing Land Use | General Plan Designation | | Zoning Designation | |
|---|---|---|---|---|---|
| **Project Site** | Flood Control/Recharge Basin | Existing | Proposed | Existing | Proposed |
| | | PU-FC/R | Villa Serena SP | PB-FC | SP |
| **North** | Multi-family Residential and Golf Course | SP | | SP | |
| **East** | Flood Control Basin | PU-FC/R | | PB-FC | |
| **South** | Single-family Residential | SFR-L and SFR-M | | RS-7.5 and RS-10 | |
| **West** | Single-family Residential | SFR-L | | RS-7.5 | |

PU-FC/R = Public Utilities--Flood Control/Recharge
PB/FC = Public/Flood Control
SP = Specific Plan
SFR-L = Single-Family Residential (Low - 0 to 4 dwelling units per acre)
SFR-M = Single-Family Residential (Medium - 4 to 10 dwelling units per acre)
RS-7.5 (RS-7,500) = Single-Family Residential (7,500 square-foot lot)
RS-10 (RS-10,000) = Single-Family Residential (10,000 square-foot lot)

## 2.3 PROJECT COMPONENTS

### 2.3.1 General Plan Amendment and Specific Plan

The Project includes a General Plan Amendment (GPA) changing the General Plan Land Use Map designation for the Site from Public Flood Control/Recharge (FC/R) to Villa Serena Specific Plan (SP), allowing residential land use development at a density of 7.1 dwelling units per acre consistent with the surrounding residential single-family low (SFR-L) and single-family medium (SFR-M) located south of the Site and the Upland Hills Country Club SP located north of the Site. Adoption by the City of the Specific Plan by ordinance will change the City's zoning map for the City from Public (PB-FC) to "Villa Serena Specific Plan."

Adoption of the Villa Serena Specific Plan (Specific Plan) implements the General Plan land use designation of SRF-M through the establishment of Site specific zoning regulations for the development of the Project Site. The Specific Plan is a comprehensive plan for development of the residential and private/common open space land uses and the necessary infrastructure improvements to serve the Site. The Specific Plan establishes the development regulations and design criteria for development of the Site as well as the procedures and requirements enabling City review and approval of development within the Project thereby ensuring that the City's General Plan, as amended for the Site, is implemented.

### 2.3.2 Demolition and Grading

The grading operation will generally consist of demolition, clearing, grubbing, and moving of surface soils to construct streets, building pads, and driveways. Grading within the Site will attempt to balance cut/fills for the Site (Figures 3a-b).

A portion of the remaining 11.1 acres proposed for the modified basin will be graded to create a new basin footprint filling the western edge of the remaining basin. A new berm will be created between the basin and Site. From the top of the berm, a new slope will be graded to the bottom of the modified basin proposed to be at an approximate elevation of 1,410 feet above mean sea level (amsl). Modifications to the bottom of the remaining basin will be made from the toe of the new slope to a point approximately 900 linear feet to the east, by grading the bottom of the basin in this area to an elevation of approximately 1,410 feet from an existing elevation of 1,414 to 1,415 feet. The excess cut material generated can be utilized as fill for the proposed new berm located at the

westerly edge of the new basin as well as for fill within the proposed Project Site. The remainder of the existing basin will be untouched by the Project. Total earthwork for the Project is estimated to be approximately 46,000 cubic yards of cut and 87,000 cubic yards of fill, resulting in import of roughly 41,000 cubic yards.

Grading plans will be reviewed and approved by the City's Land Development and Transportation Division of the Public Works Department prior to the issuance of grading permits. All grading plans and activities will conform to the City grading ordinance and dust and erosion control requirements.

### 2.3.3 Design Elements

The Project will result in the development of 65 single-family detached residential dwelling units designed around a private two-way street system with pedestrian walkways linking residences to on-site common area open space and to existing adjacent roadways connecting to existing nearby recreational amenities and commercial services (Figures 4a-b). Residential lot sizes will range in size from 3,337 to 5,048 square feet. Residential units will be designed to front onto private streets with floor plans designed to present an "architecture forward" image so that the residence and not the garage is the predominant view from the street. Residential design incorporates human-scale details to promote a pedestrian friendly character for the community. Such details include the use of enhanced entries, a mix of materials and textures, and authentic detailing on elements such as windows, porches, doors, and lighting.

The Project provides a strong community identity for residents and visitors through a unified approach to Site design, architecture, and landscape design elements. The landscaped private street and street adjacent walkways link residences to common area open space encouraging neighborly interaction.

*Design*. Three separate and distinct architectural styles influenced by thematic architecture found within California have been selected for the Site. These styles are influenced and inspired by the themes of each style, all represented in historical California architecture.

*Spanish.* Spanish style architecture is a style that evolved from the architecture of the early Spanish colonies of North and South America, retaining the forms and textures of its cultural origin and updating them to fit a more modern context. This regional expression combines the basic forms of traditional Spanish and Mexican architecture with local styles prevalent at the time, such as Mission and Arts and Crafts to create architecture with a fine sense of detailing and a rich palette of materials. This style can borrow from both the hacienda and bungalow, and can be represented in a variety of interpretations as seen throughout the Southland. Some distinguishing features of this historic style include plaster walls, chimneys with distinctive hoods, low-pitched clay tile roofs and decorative wrought iron. Decorative tile, terra cotta pavers, finials and wood decks or balconies are also employed to add color, texture, and accent to this Southern California aesthetic (Figures 5a-b).

*Italianate.* The Italianate style as interpreted and conceived by Southern California architects of the early 20th century adapted the grand formal elegance of the Italian Renaissance estate with a localized approach to detailing and scale. Composed primarily of stacked two-story forms, the front elevations of these homes display a distinct organization of windows and doors, with a centrally located, articulated entry. Key identifying features of this style include low-pitched hip

roofs, decorative eave brackets, horizontal banding, round columns, and arched elements, particularly above rectangular windows. Southern California architects also used awnings, decorative shutters, and wrought iron to achieve a regional aesthetic while retaining strong connections to the style's origins (Figures 6a-b).

*French Country.* French Country architecture is derived from a mixture of European influences. After the adoption of stone and brick veneer techniques of the 1920s, the look became extremely popular across the country. Although the style is looked upon as a small plan form, it is considered one of the most recognized styles in suburban America. The French Country style emphasizes an asymmetrical plan and roof form, and details emphasize specific portions of the home such as the entry, gable end components with corbels, shutters, and window shelves. Stone veneer or gable end siding are incorporated for texture and color accompaniments. This style has a steeper roof slope than other styles which provides for a diverse street scene (Figures 7a-b).

### 2.3.4 Common Area Open Space

The Project provides approximately one acre (42,266 square feet) of common area open space. A 0.75-acre recreation area is planned with a community pool, pool house with restrooms, and areas improved with picnic tables, a children's play area, and barbeque and picnic areas. Four individual pocket parks totaling 9,526 square feet are planned for passive recreation uses by residents. The smallest pocket park is approximately 1,700 square feet and the largest is approximately 3,550 square feet. The pocket parks are accessible from Project sidewalks and will include shady landscape areas with benches, picnic tables, and children's play areas (see Figure 4b and Figures 8a-b).

### 2.3.5 Pedestrian and Bicycle Connectivity

The Project includes a private two-way street system with sidewalks on both sides of the street providing pedestrian connectivity throughout the Site. The connection of the Project street and walkway system to 15th Street is detailed in Figure 9. From the project site, Sierra Vista Park and Upland Memorial Park are located approximately 0.5 mile west and 0.8 mile south of the Site, respectively. The Colonies Crossroads Center, providing grocery, restaurants, personal services, entertainment, and home goods, is located within biking distance from the Site.[4] A commercial center, including a Walmart Neighborhood Market, is located on Foothill Boulevard, approximately 0.75 mile south of the Site.

### 2.3.6 Circulation

Vehicular access to the Site is provided from 15th Street at two locations. A primary gated community entry for the Project is located at the eastern Project boundary adjacent to existing residential uses. A second gated entry is provided from 15th Street at the western boundary of the Project. An internal private two-way street system provides primary circulation within the Site serving residential dwellings and the common area open space. The width of the private two-way street will vary from 26 to 38 feet. On-street parking is permitted in designated segments of the street. A 5-foot wide sidewalk with adjacent wedge curb is provided on both sides of the street where homes front both sides of the street. In instances where the sides of homes are also adjacent to the street a 5-foot wide curb adjacent sidewalk is provided on the same side of the street. Where

[4] Via 15th Street, Alta Avenue, 14th Street, and Campus Avenue, travel distance to this center is approximately 2.0 miles.

the centrally located common area open space fronts the street on one side and residential units front the street on the opposite side a 5-foot wide sidewalk is provided on both sides of the street. Emergency vehicle access is provided at both Project entries along 15th Street. Enhanced paving materials are planned to be installed at the main Project entry and in three locations along Street A (Figures 10a-b). All streets within the Site are planned as private roadways.

Maintenance crews serving the remaining Upland Basin flood control and detention basin are provided vehicular access through the Project's street system. A service road and gate are located at the easterly boundary of the Project Site for maintenance vehicles to access the basin.

Ultimate right of way improvements for 15th Street include 40 feet of paved travel area with a five-foot wide sidewalk and an eight foot wide landscaped parkway on each side of 15th Street (total right-of-way of 66 feet). The developer will construct an additional eight feet of travel area, a new five-foot wide sidewalk and an eight-foot wide landscaped parkway within the existing right-of-way adjacent to the Site.

### 2.3.7 Landscaping

Landscape design encompasses "hardscape" elements such as entry monuments, signage, walls, fences, gates, paving, recreation and picnic equipment, as well as "softscape" elements such as trees, shrubs, vines and ground cover. All landscape elements should be compatible with the scale of the adjacent architecture and the surrounding space. Water conservation and long-term maintenance should be kept in mind when selecting specific plant material. Hydrozoning (grouping plants with similar water requirements) will be required.

*Primary Entry.* The Project's primary entry (Figure 11a) will include the following:

- Use of large specimen canopy trees to anchor each side of the entry drive and enhanced paving at the entry drive.
- A 6-foot high tubular steel fence and gate and a 6-foot high stone veneer monument wall with pilasters on each side with architectural detailing to match the monument wall.
- Parkway trees within the 15th Street right of way adjacent to the Site.
- A variety of accent trees and shrub masses planted in a series of layers (foreground, mid ground, background at the Project entry, and along 15th Street adjacent to the Site) to help define borders and plant groupings while combining interesting foliage textures and color.
- Accent lighting for landscape and monumentation.

*Interior Streets.* Streetscape design (Figure 11b) within the interior of the Site will be consistent in character and should help to promote pedestrian circulation within the community. Streetscapes are designed to provide a clear delineation between pedestrian and vehicular travel areas. Shrubs, low groundcovers, and "California Friendly" ornamental grasses are used to the greatest extent possible to reduce maintenance and conserve resources. The planting plan for streets includes informal plantings of trees, shrubs, groundcovers, and grasses. Uniformed spacing of trees is avoided in order to create an interesting and inviting pedestrian experience while also offering visual interest to motorists encouraging them to slow driving speeds and observe their surroundings. The following design criteria apply to streetscape design for the Project.

- Landscape treatments of each street shall be consistent throughout the length of the street in the neighborhood.
- Landscape treatments shall generally utilize street trees planted at intervals of 50 feet on center as feasible. Street trees shall be placed a minimum of eight feet from street light standards.
- Street tree planting as described below shall generally utilize one or two primary species for each street with a limited number of add additional species to be used as accent planting.

*Walls and Fencing.* Walls and fences will be designed to complement and reinforce landscape design in establishing the image and theme of the community. Community walls constructed as part of the Project will be decorative in nature. Community perimeter walls constructed as part of the Project, interior community return walls and the community entry wall along 15th Street will be constructed of split face block. Use of decorative caps and pilasters to help enhance the perimeter appeal of the walls is required. All perimeter walls shall be constructed within the boundaries of the Site. Rear yard property walls constructed will be decorative split face block with accent pilasters at intervals along the wall. Vinyl fencing may be used along interior residential property lines.

### 2.3.8 Infrastructure

*Water*. Water service to the Site is provided via an existing 10-inch diameter water main located in 15th Street. The Project includes construction of a network of eight-inch diameter on-site water mains adequate to provide for the domestic and fire protection water requirements (Figure 12).

*Wastewater.* Existing off-site sewer facilities available to serve the Site include an existing eight-inch diameter sewer main located in 15th Street adjacent. The Project includes the construction of an on-site network of new eight-inch sewer mains and the relocation of one existing eight-inch off-site sewer main connecting to the on-site system (Figure 13).

*Drainage.* The Site's existing drainage generally drains from east to west as part of a regional detention basin consisting of an essentially flat bottom, with 3:1 side slopes. The proposed drainage will convey flows from the residential lots and streets into a storm drain collection system on Site, which includes street flow. Runoff will then be passed through an underground infiltration basin and outlet into a new 12-foot by 8-foot reinforced concrete box culvert which outlets into the detention basin (Figure 14).

*Basin Modifications.*[5] The Project includes modifications (including relocation of existing basin infrastructure) to the existing basin to accommodate the residential Site and maintain a fully operational flood control and retention facility on the remaining 11.1 acres of the basin area (see Figure 3c). The 9.2-acre area proposed for residential development will be graded to fill this portion of the existing basin. Modifications to the basin include:

- Extension of the basin inlet, located in the northwest corner of the existing basin, to the new eastern edge of the Site. New storm drain improvements will consist of a combination of 12' × 8' and 10' × 9.5' RCBs. The improvements will extend approximately 1,900 linear feet (LF) from west to east along the southern edge of the Site and outlet through a new headwall in the

[5] The proposed basin and outlet modifications are assessed in the project-specific hydrology reports (Madole 2017) and 15th Street Basin Technical Memoranda (Q3 Consulting, July 31, 2018, and September 10, 2019).

modified basin. The modified inlet will also pick up two existing smaller inlets tributary to the basin within the Site as follows:

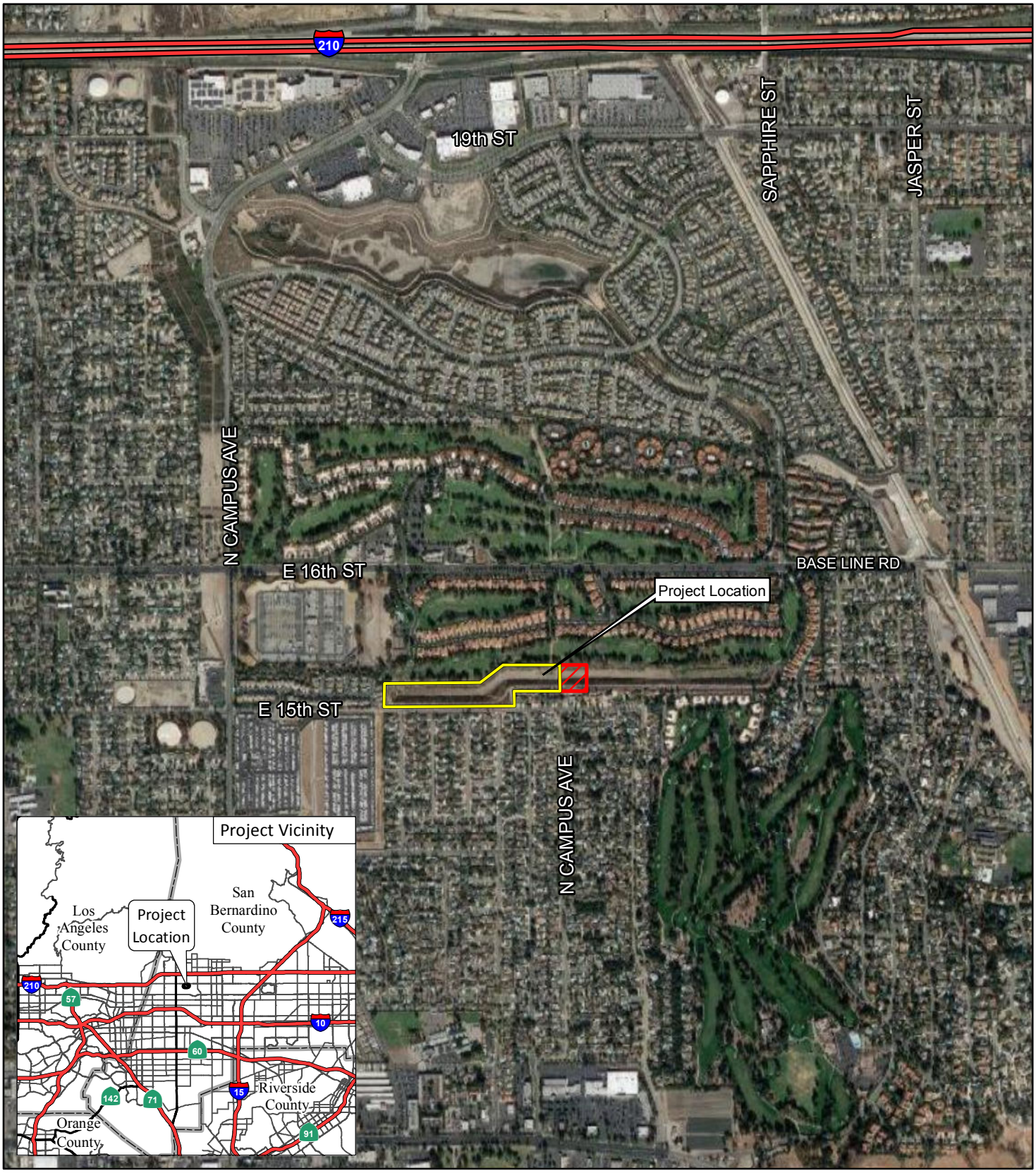
- An existing local inlet pipe located approximately 300 feet east of the Site eastern boundary is anticipated to be a 36" reinforced concrete pipe (RCP) routed through the Site to the new inlet.
- An existing concrete trapezoidal channel located approximately 60' west of the eastern edge of the Project Site will be picked up in an approximately 48" diameter pipe and routed through the Site into the new inlet round catch basin (RCB).

- Extension[6] of approximately 1,800 LF of the basin outlet from the western edge of the Site to the eastern edge of the Site. This extension is proposed to be an 84" RCP to account for the design outlet as well as the spillway flows and includes a new outlet structure in the basin. The proposed pipe will extend from the southeast corner of the Site west to the main Project entry, then south into 15th Street and west along 15th Street connecting to the existing outlet pipe. Easements will be granted to the City for all basin infrastructure proposed to be located within the Site.
- To satisfy San Bernardino County criteria and City Public Works Department comment, the project has provided an emergency spillway alternative.[7] The existing basin would be retrofitted to accommodate a trapezoidal emergency spillway with a crest at an elevation of 1,426.6 feet amsl. The emergency spillway, having a base of 16 feet and a top width of 48.4 feet, would be installed at the end of Grove Avenue. Combined with the proposed box weir outlet system, potential impacts associated with project development would be minimized. The box weir outlet system would be designed to pass through the 200- or 500-year storm, with the emergency spillway providing discharge capacity for larger events.

*Water Quality.* The Project provides for on-site storm water retention and infiltration to mitigate an 85th percentile storm. This is accomplished by passing the on-site runoff through a continuous deflection separator (CDS) unit for pretreatment and then an underground infiltration basin to infiltrate runoff from the majority of the Site. The underground infiltration basin is proposed to be 23 × 123 feet and will have dual 72-inch perforated pipes encased in gravel. In addition, there are two Modular Wetland Systems, one located at each Project entry, to treat on-site areas that are not tributary to the underground basin.

[6] To potentially reduce the sizes of new pipes, the Project conducted an analysis of basin bypass alternative, which would divert flows (low- or high-level flows) directly to the existing outlet pipe system. The bypass alternative did not satisfy the requirements associated with the existing system; therefore, this alternative was not carried forward.

[7] A box-weir system with a 144-inch diameter outlet pipe was also determined capable of handling the design discharge. While this system would not require the new open channel emergency spillway in the basin, it could not be accommodated at this location.




LSA

LEGEND

Project Site

Area of Off-Site Improvements

N

0 625 1250

FEET

SOURCE: RCA (2018); Google (2018)

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FIGURE 1

*Villa Serena Specific Plan*

Regional and Project Location




LSA

LEGEND

Project Site

Area of Off-Site Improvements

N

0 175 350

FEET

FIGURE 2

*Villa Serena Specific Plan*

Project Setting

SOURCE: RCA (2018); Google (2018)

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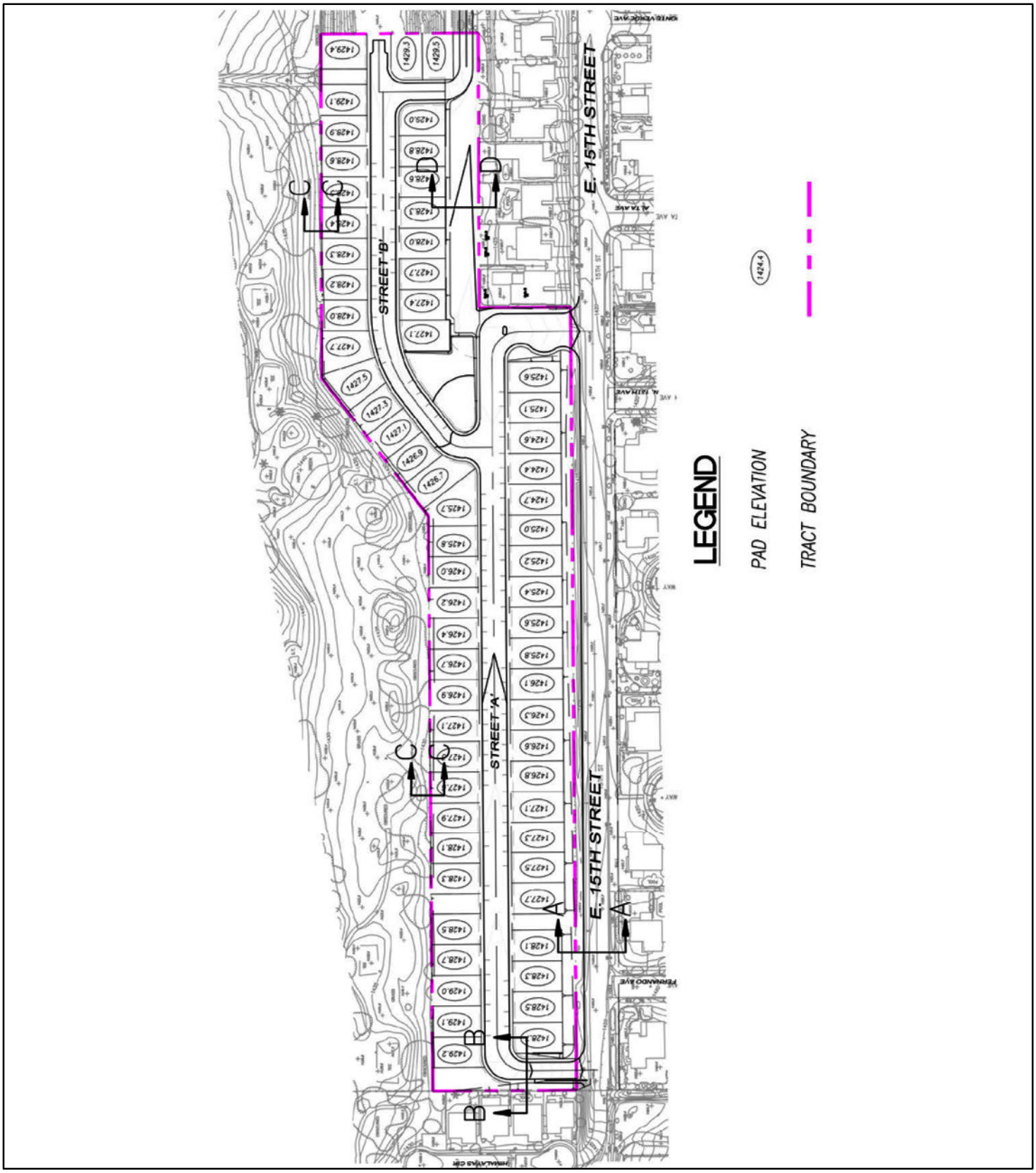


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FIGURE 3a

*Villa Serena Specific Plan*

Conceptual Grading Plan

SOURCE: Proactive Engineering Consultants (2018)

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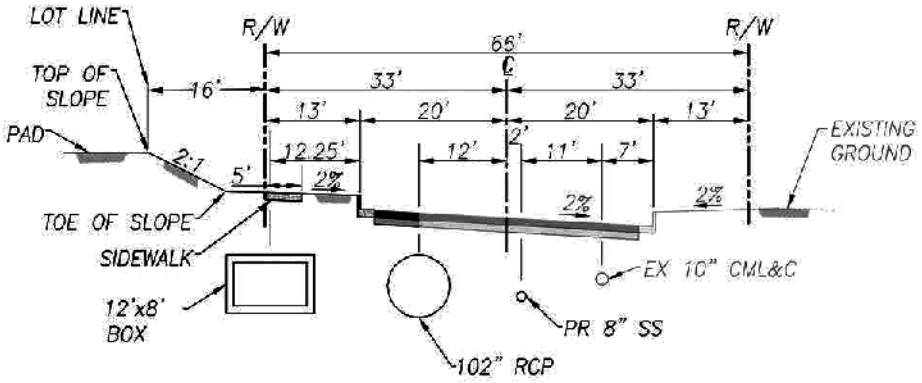
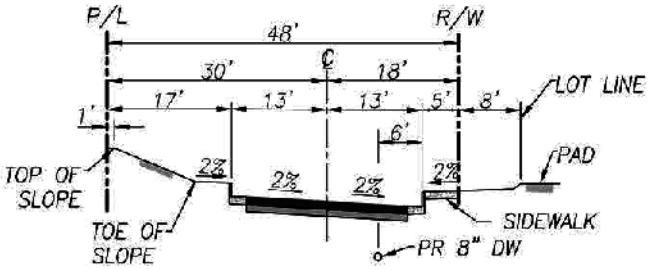



**SECTION A-A**

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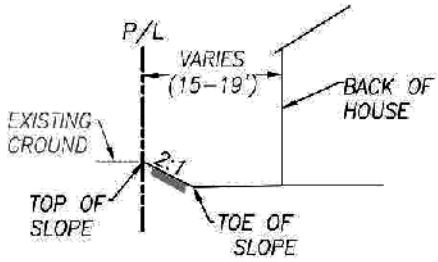
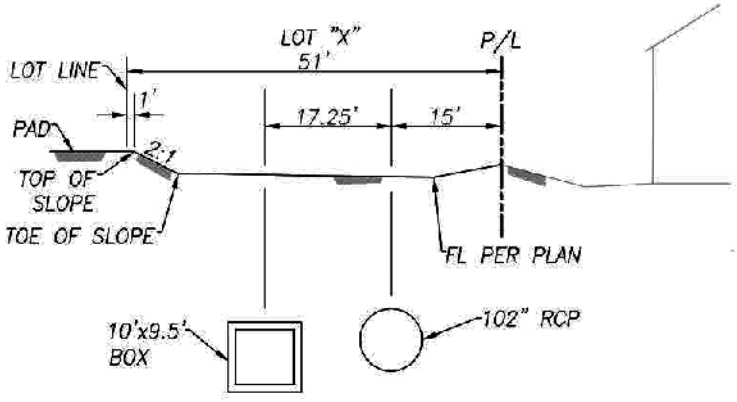



**SECTION C-C**




**SECTION D-D**

LSA

FIGURE 3b

*Villa Serena Specific Plan*

Conceptual Grading Plan - Cross Sections

SOURCE: Proactive Engineering Consultants (2018)

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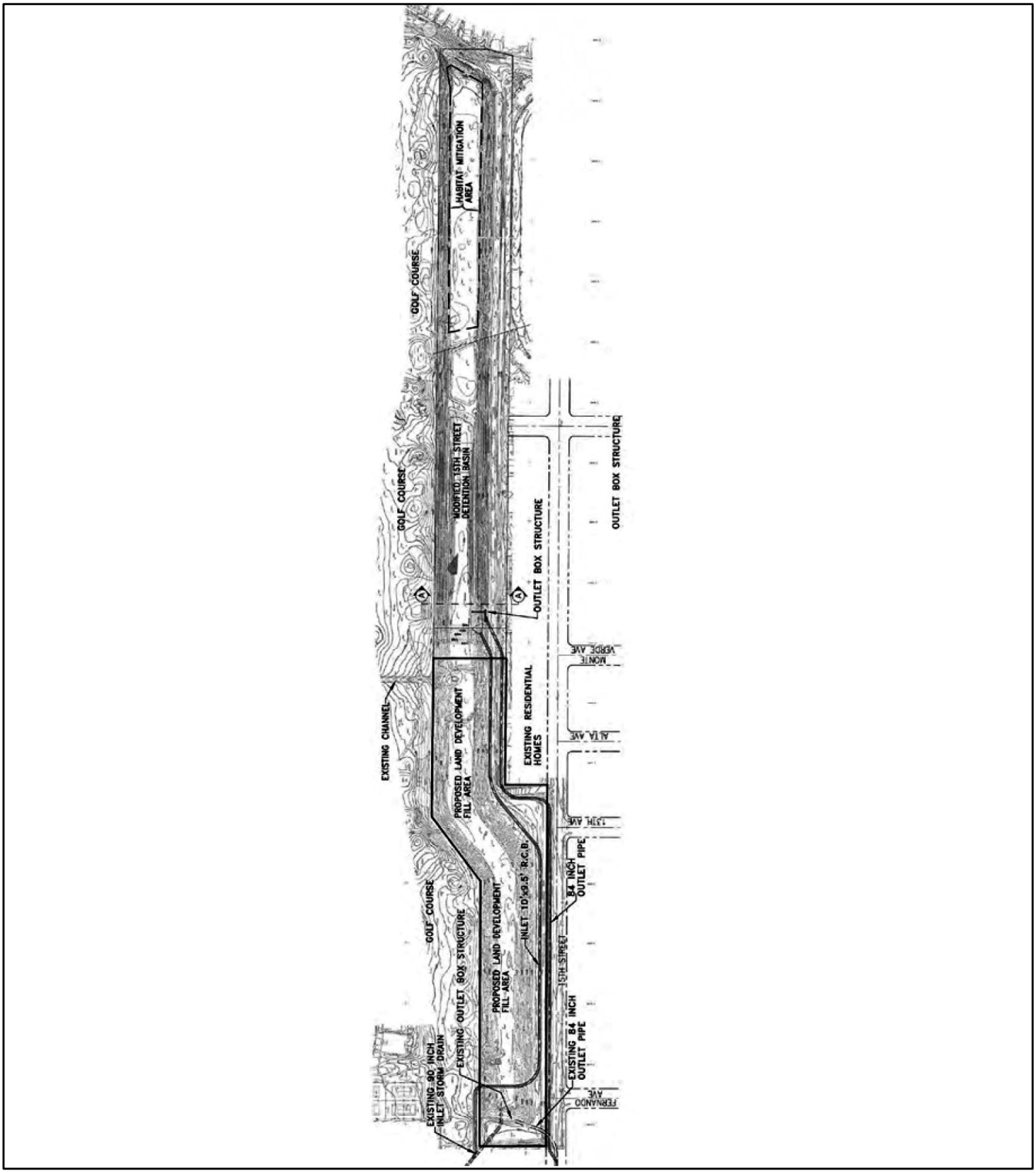


LSA

FIGURE 3c

*Villa Serena Specific Plan*

Conceptual Basin Modification Plan

SOURCE: Proactive Engineering Consultants (2019)

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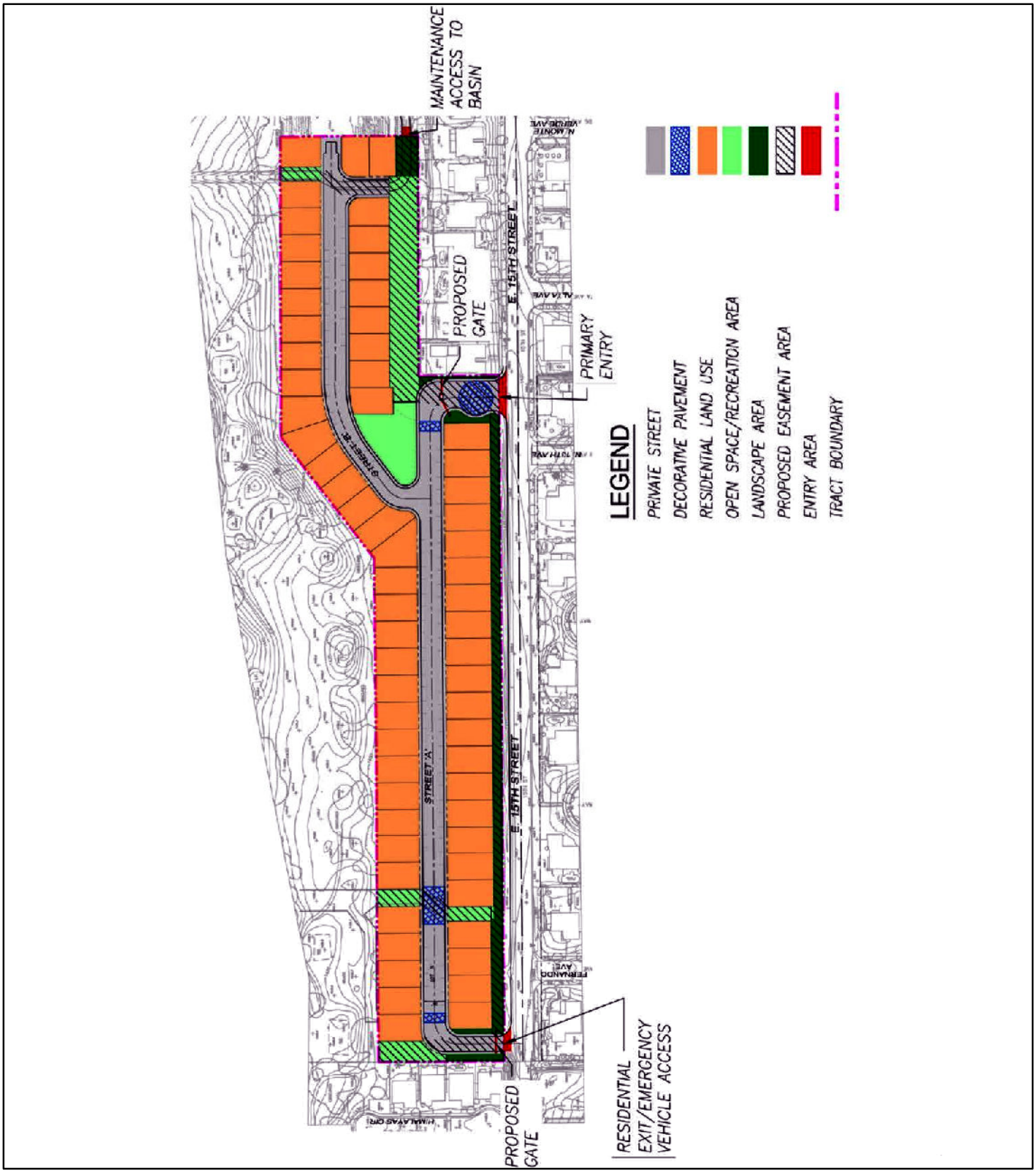


LSA

FIGURE 4a

*Villa Serena Specific Plan*

Land Use Plan

SOURCE: Proactive Engineering Consultants (2018)

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LSA

FIGURE 4b

*Villa Serena Specific Plan*

Conceptual Site Plan

SOURCE: Bassenian/Lagoni (8/30/2018)

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PLAN 1



PLAN 2



PLAN 3

LSA

FIGURE 5a

*Villa Serena Specific Plan*

Architectural Renderings - Spanish Style

SOURCE: Bassenian/Lagoni (2018)

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LSA

FIGURE 5b

*Villa Serena Specific Plan*

Spanish Style - Details

SOURCE: Bassenian/Lagoni (2018)

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PLAN 1



PLAN 2



PLAN 3

LSA

FIGURE 6a

*Villa Serena Specific Plan*

Architectural Renderings - Italianate Style

SOURCE: Bassenian/Lagoni (2018)

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LSA

FIGURE 6b

*Villa Serena Specific Plan*

Italianate Style - Details

SOURCE: Bassenian/Lagoni (2018)

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PLAN 1



PLAN 2



PLAN 3

LSA

FIGURE 7a

*Villa Serena Specific Plan*

Architectural Renderings - French Country Style

SOURCE: Bassenian/Lagoni (2018)

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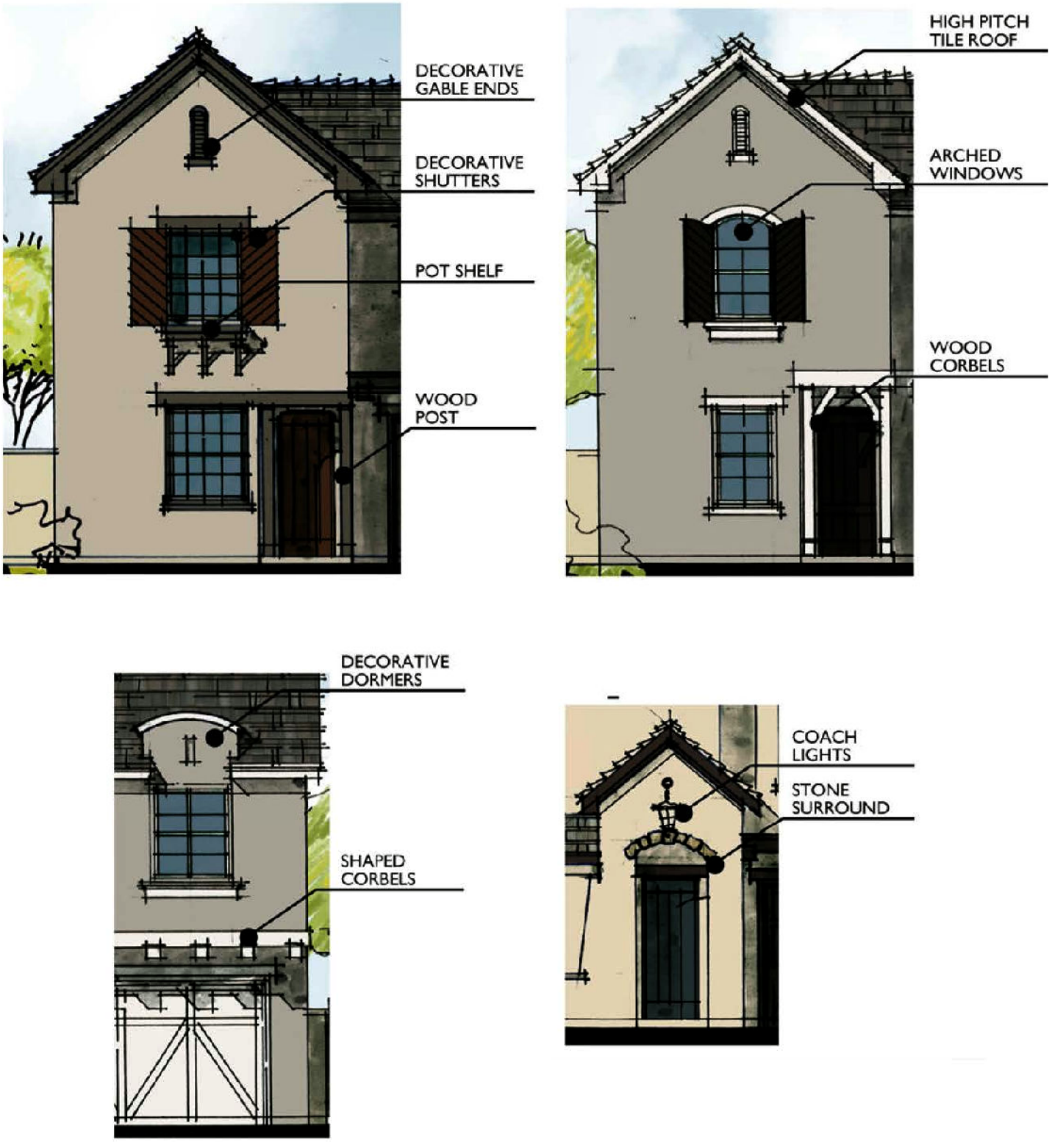


LSA

FIGURE 7b

*Villa Serena Specific Plan*

French Country Style - Details

SOURCE: Bassenian/Lagoni (2018)

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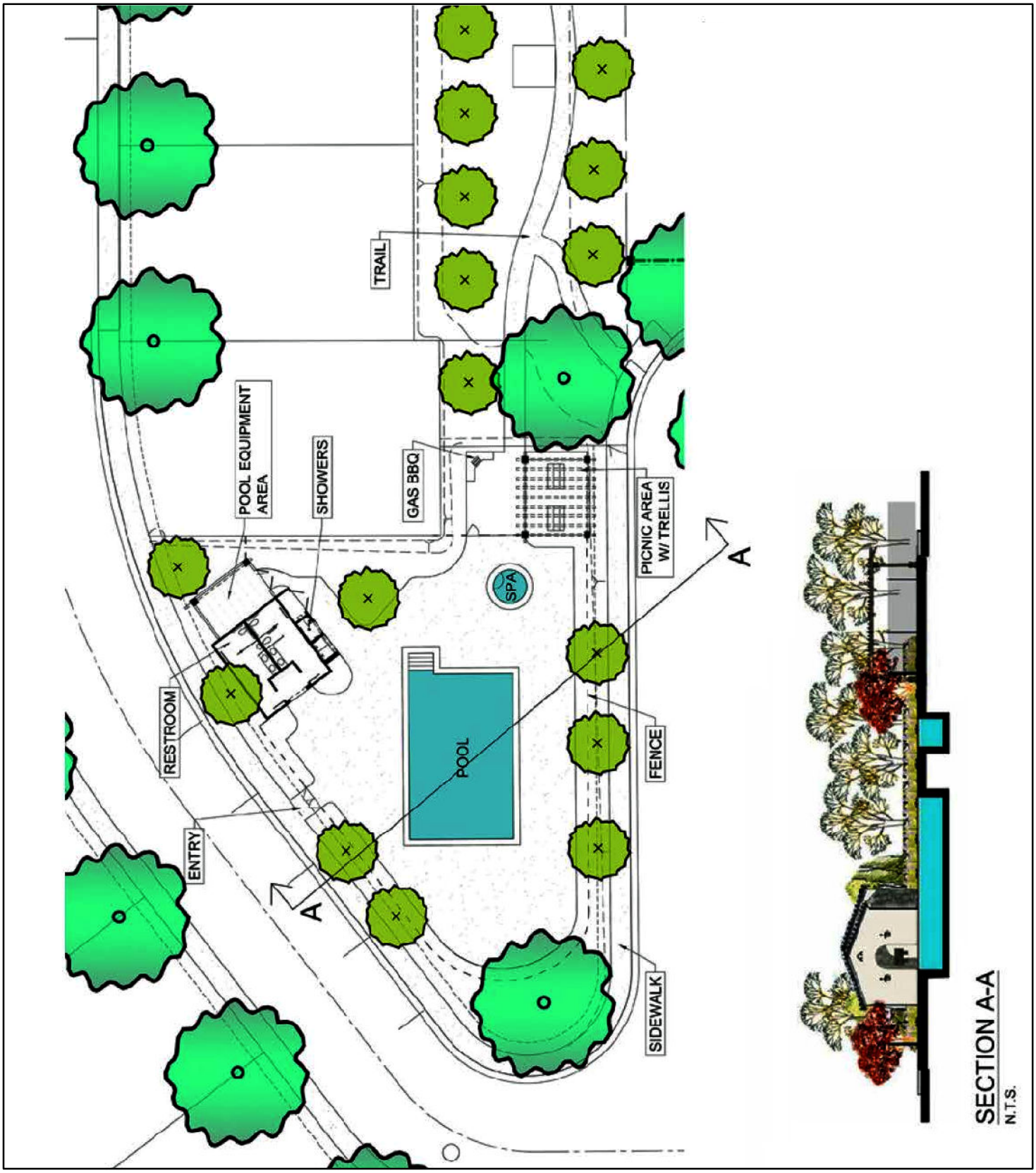


LSA

FIGURE 8a

*Villa Serena Specific Plan*

Central Open Space Plan

SOURCE: Bassenian/Lagoni (2018)

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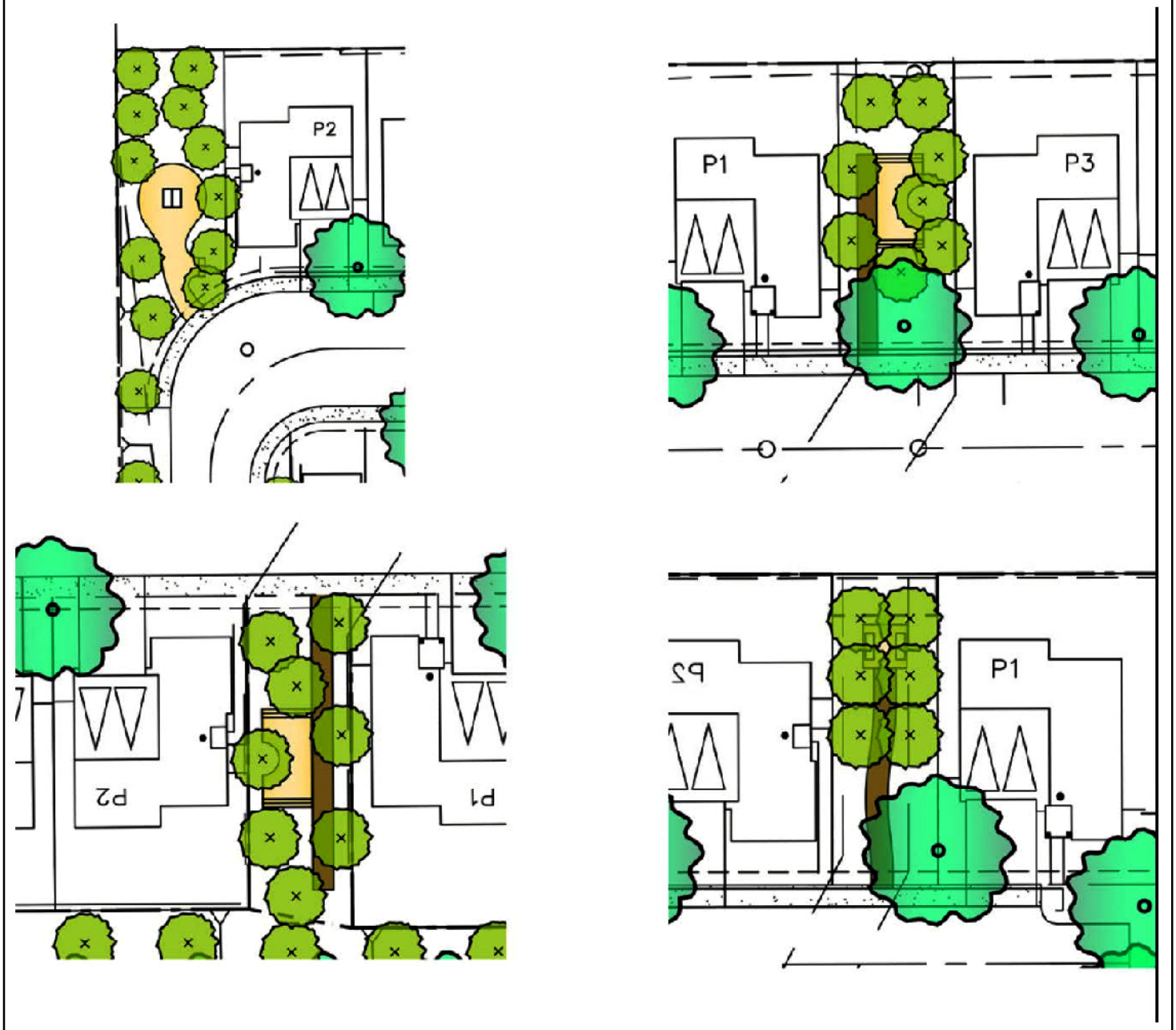



LSA

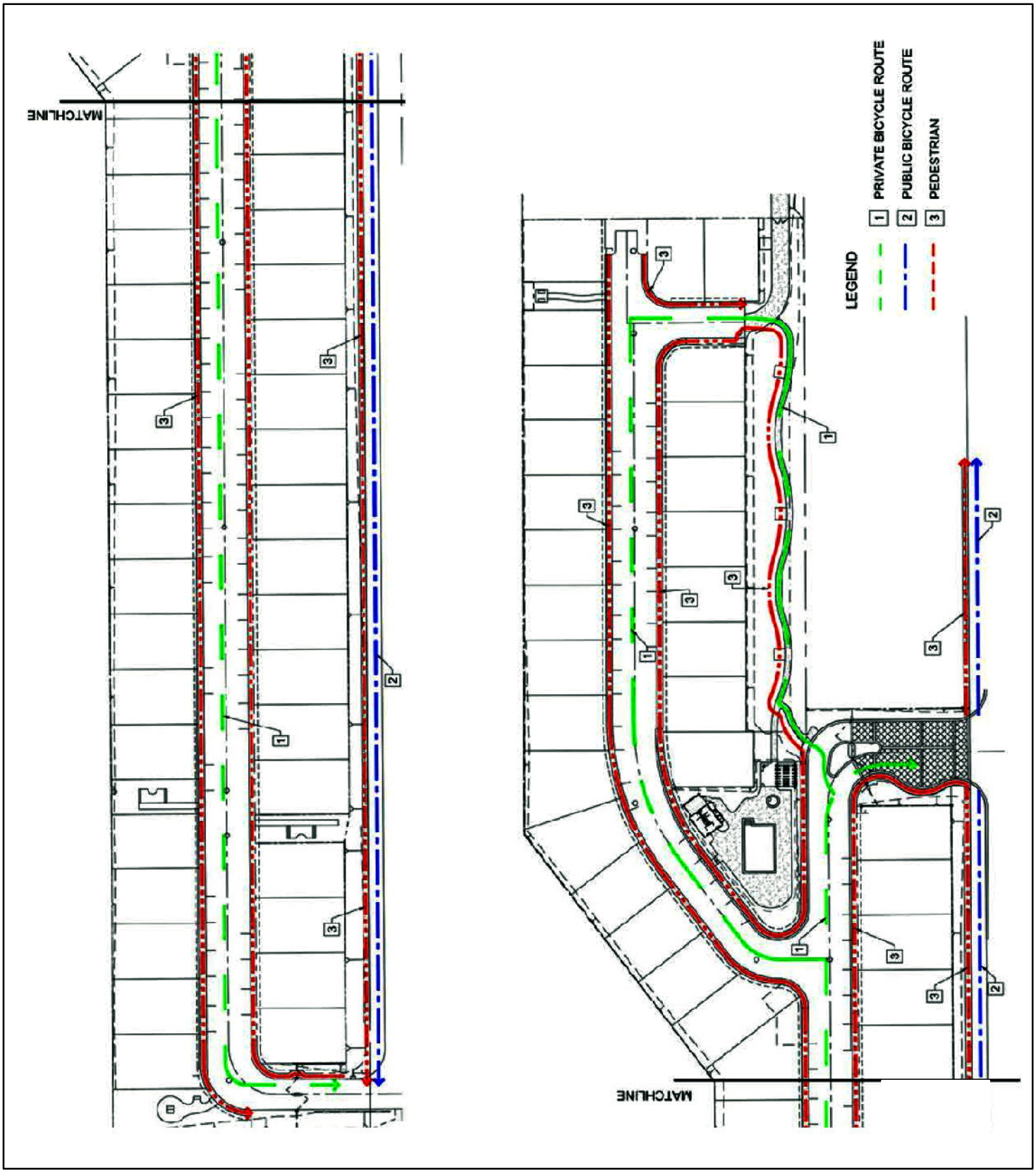
FIGURE 8b

*Villa Serena Specific Plan*

Pocket Park Plans

SOURCE: Bassenian/Lagoni (2018)

I:\FTR1801\GIS\MXD\IS\PocketParkPlans.mxd (10/17/2018)




LSA

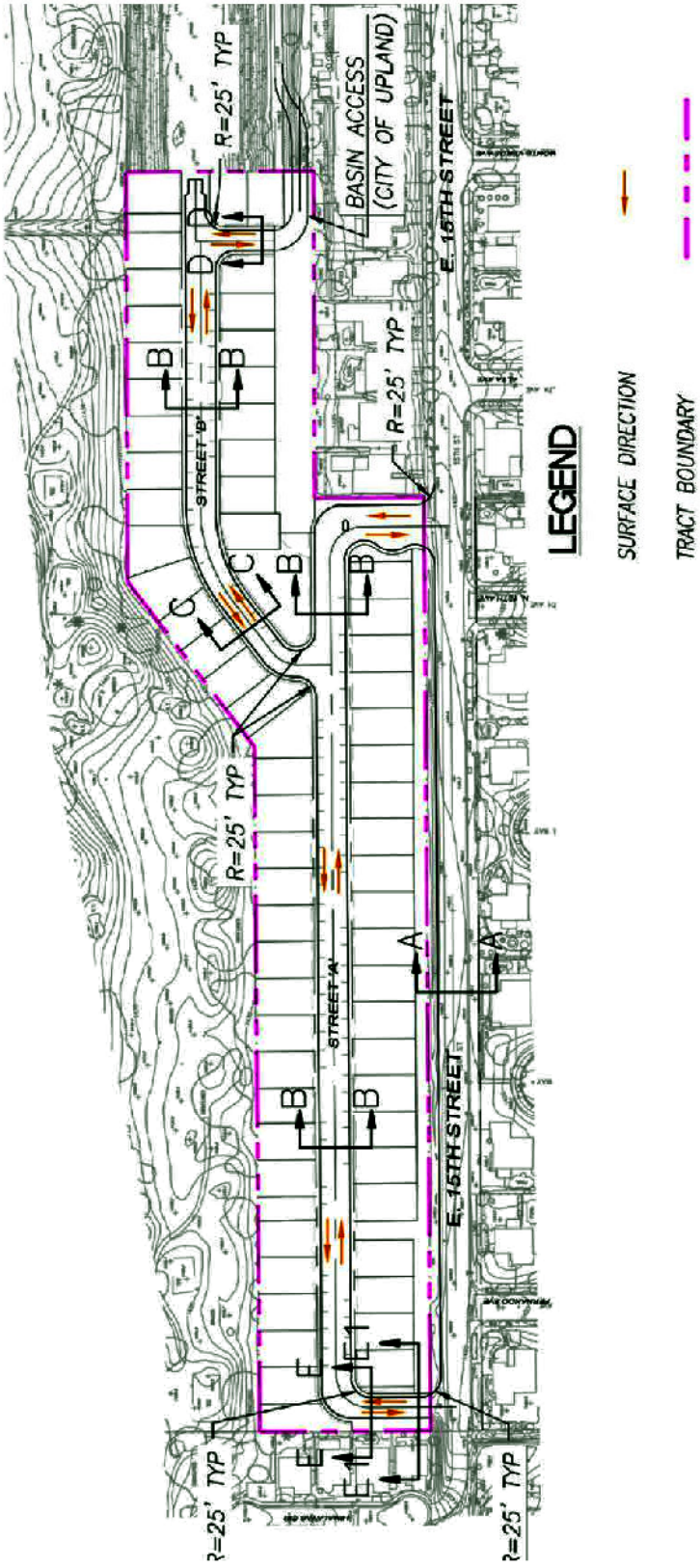
FIGURE 9

*Villa Serena Specific Plan*

Connectivity Plan

SOURCE: Bassenian/Lagoni (2018)

I:\FTR1801\GIS\MXD\IS\ConnectivityPlan.mxd (10/17/2018)




LSA

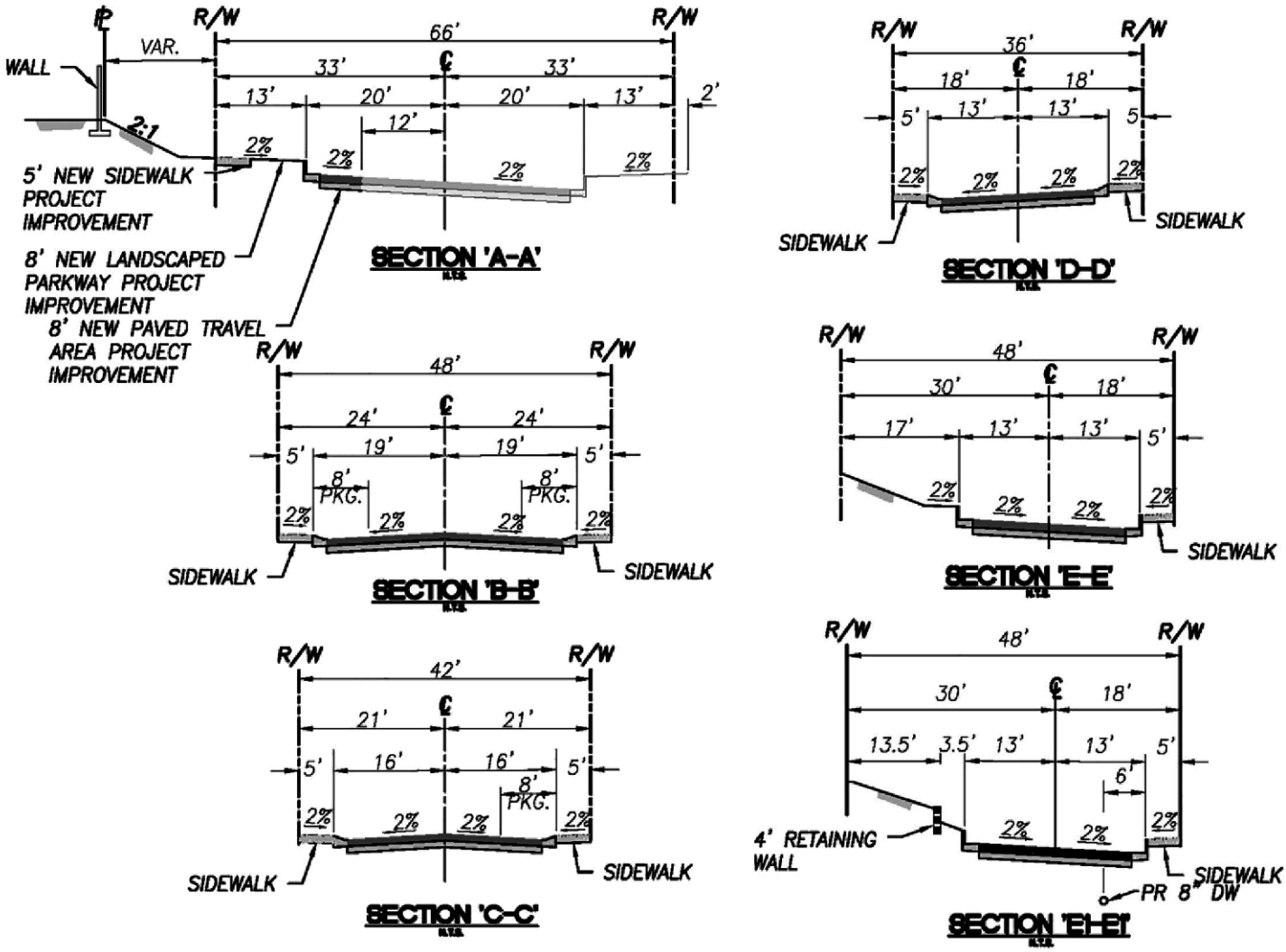
FIGURE 10a

*Villa Serena Specific Plan*

Master Plan of Circulation

SOURCE: Proactive Engineering Consultants (2018)

I:\FTR1801\GIS\MXD\IS\MasterPlan_ofCirculation.mxd (10/17/2018)




LSA

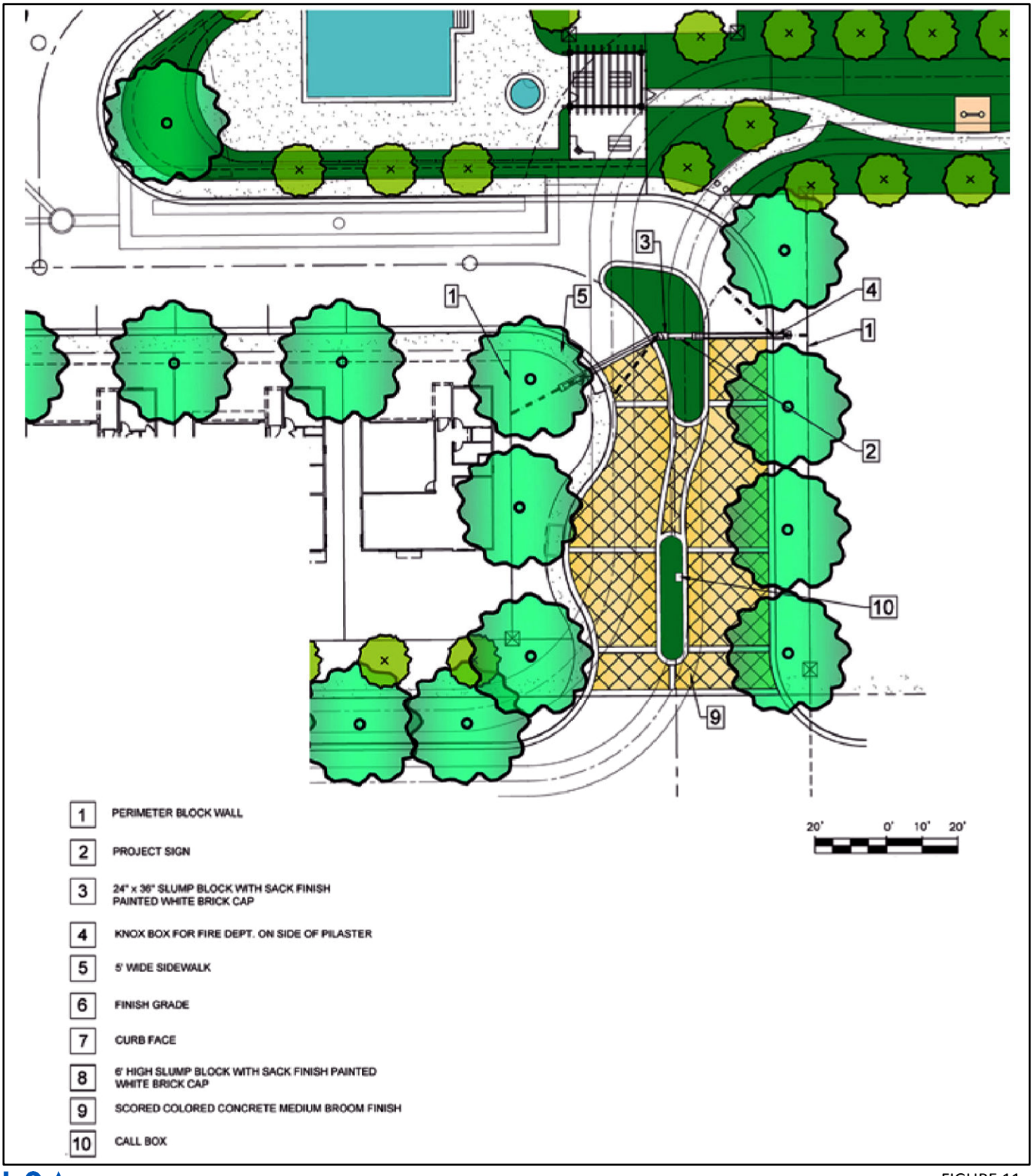
FIGURE 10b

*Villa Serena Specific Plan*

Street Cross Sections

SOURCE: Proactive Engineering Consultants (2019)

I:\FTR1801\GIS\MXD\IS\StreetCrossSections.mxd (7/22/2019)




LSA

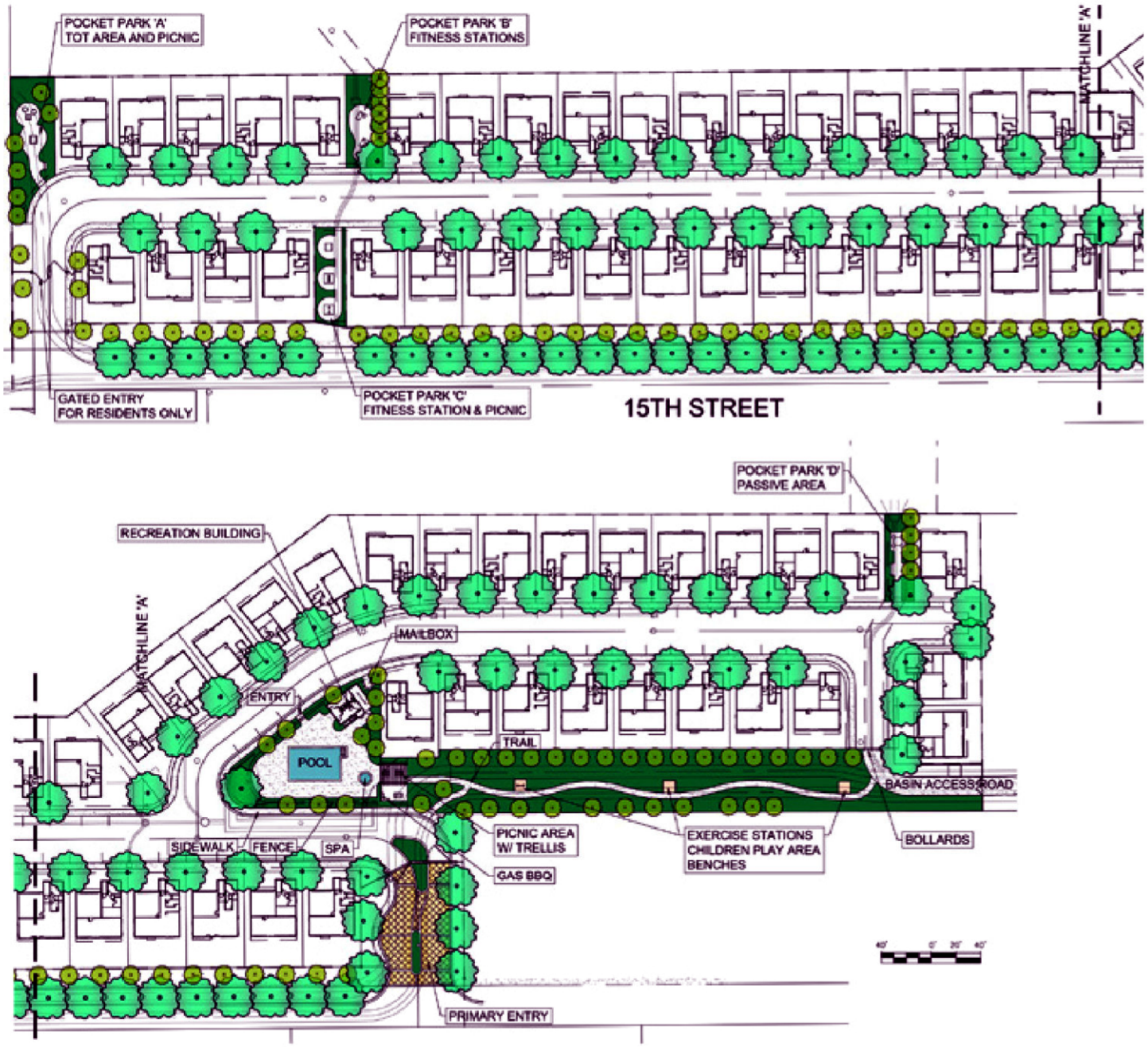
FIGURE 11a

*Villa Serena Specific Plan*

Primary Community Entry

SOURCE: Bassenian/Lagoni (2019)

I:\FTR1801\GIS\MXD\IS\PrimaryCommunityEntry.mxd (7/22/2019)




LSA

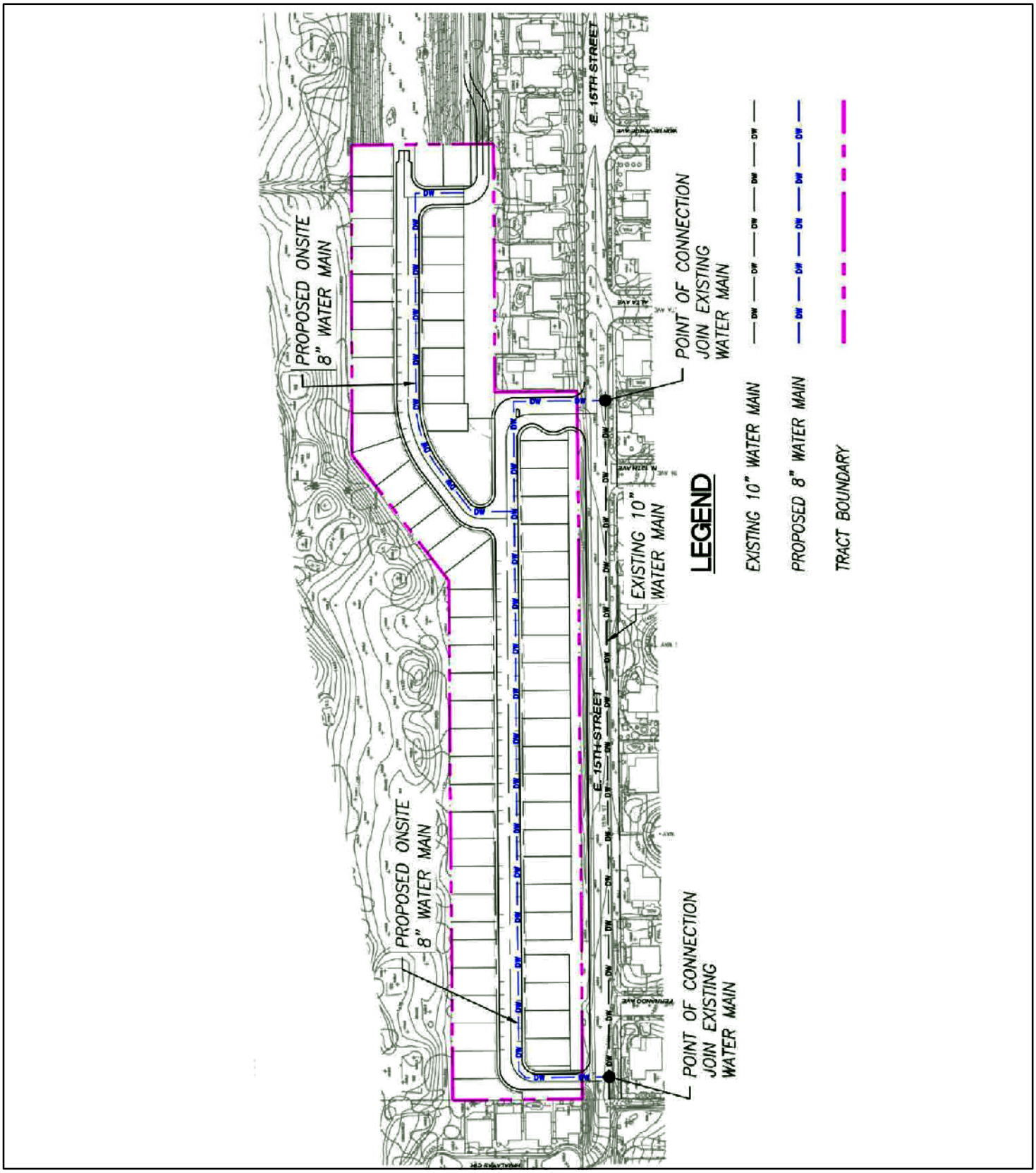
FIGURE 11b

*Villa Serena Specific Plan*

Conceptual Landscape Plan

SOURCE: Bassenian/Lagoni (2019)

I:\FTR1801\GIS\MXD\IS\ConceptualLandscapePlan.mxd (7/22/2019)




LSA

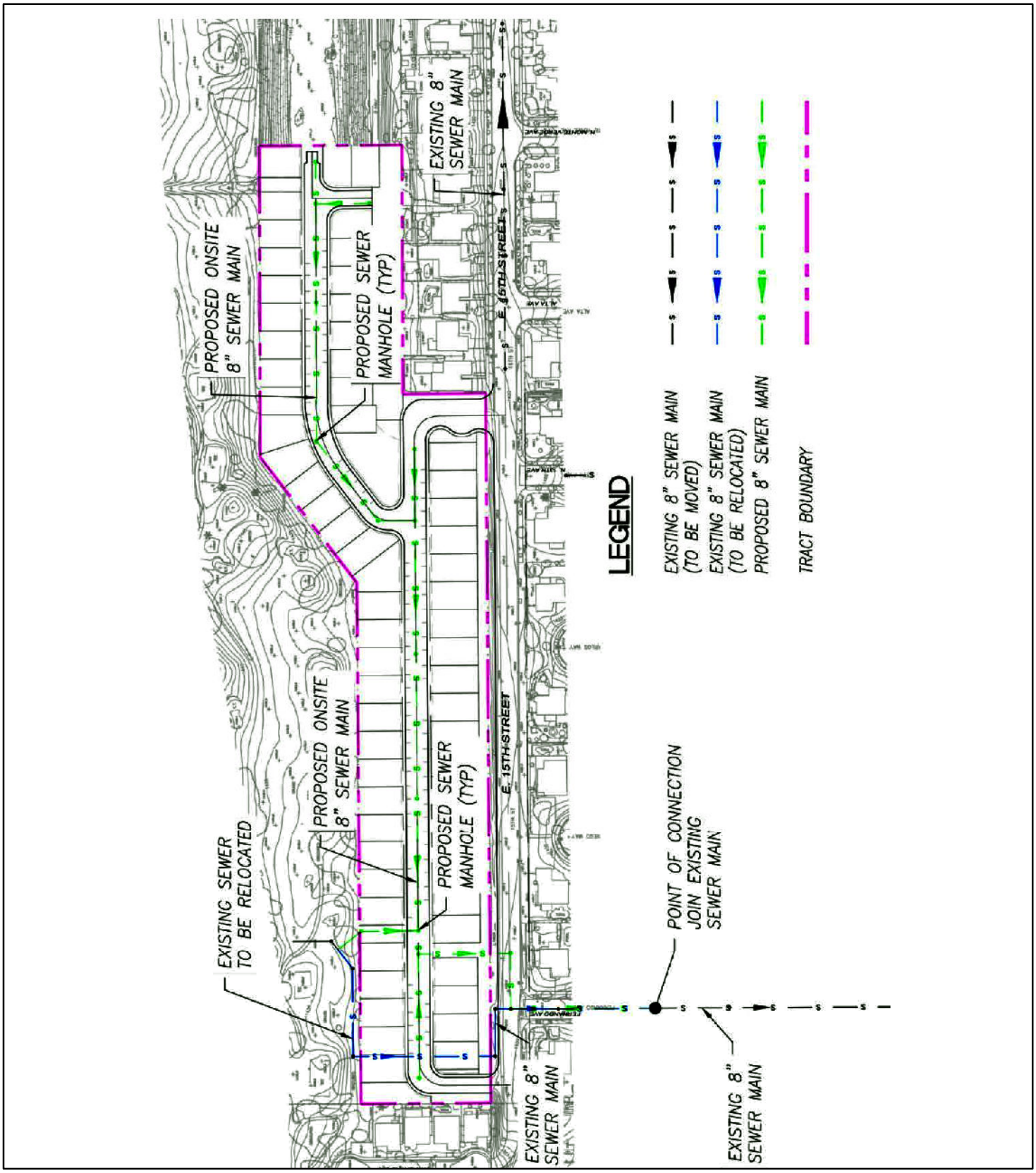
FIGURE 12

*Villa Serena Specific Plan*

Water Master Plan

SOURCE: Proactive Engineering Consultants (2018)

I:\FTR1801\GIS\MXD\IS\WaterMasterPlan.mxd (10/17/2018)



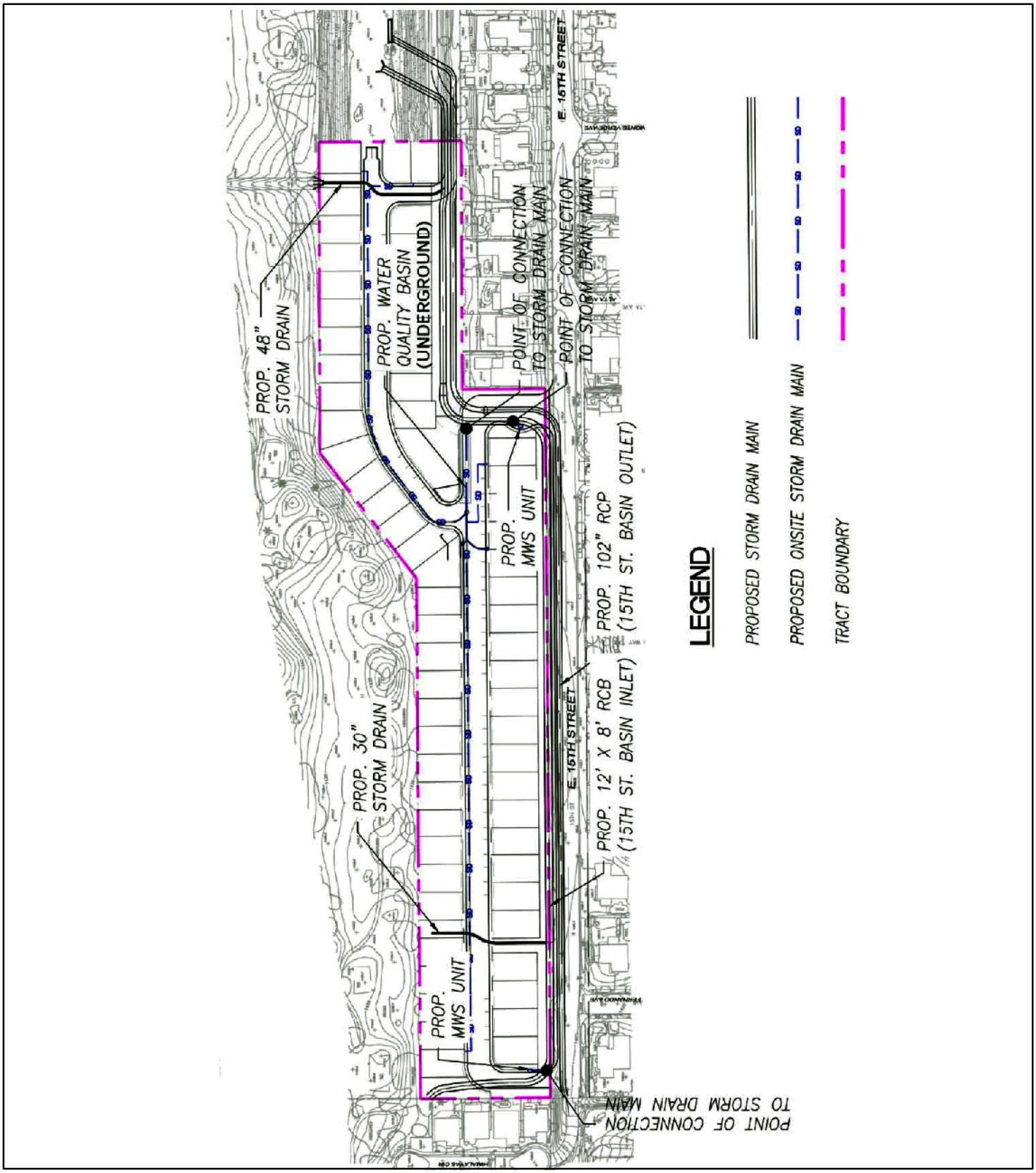

LSA

FIGURE 13



SOURCE: Proactive Engineering Consultants (2018)

I:\FTR1801\GIS\MXD\IS\SewerMasterPlan.mxd (10/17/2018)




LSA

FIGURE 14

*Villa Serena Specific Plan*

Storm Drain Master Plan

SOURCE: Proactive Engineering Consultants (2018)

I:\FTR1801\GIS\MXD\IS\StormDrainMasterPlan.mxd (10/17/2018)

# 3.0 INITIAL STUDY/ENVIRONMENTAL CHECKLIST FORM

## 3.1 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below (☒) would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages. As detailed on the following pages, no immitigable Potentially Significant Impact associated with the development or operation of the Project was identified.

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Greenhouse Gas Emissions | ☐ | Public Services |
| ☐ | Agriculture and Forestry Resources | ☐ | Hazards & Hazardous Materials | ☐ | Recreation |
| ☐ | Air Quality | ☐ | Hydrology/Water Quality | ☐ | Transportation/Traffic |
| ☐ | Biological Resources | ☐ | Land Use/Planning | ☐ | Tribal Cultural Resources |
| ☐ | Cultural Resources | ☐ | Mineral Resources | ☐ | Utilities/Service Systems |
| ☐ | Energy | ☐ | Noise | ☐ | Wildfire |
| ☐ | Geology/Soils | ☐ | Population/Housing | ☐ | Mandatory Findings of Significance |

## 3.2 DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial evaluation:

| | |
|---|---|
| I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION would be prepared. | ☐ |
| I find that although the Proposed Project could have a significant effect on the environment, there would not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION would be prepared. | ☒ |
| I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. | ☐ |
| I find that the Proposed Project MAY have a "potential significant impact" or "potentially significant Unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. | ☐ |
| I find that although the Proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Proposed Project, nothing further is required. | ☐ |

Signature _____ Date _____

Printed Name _____ Title _____

## 3.3 EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to Projects like the one involved (e.g., the Project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on Project-specific factors as well as general standards (e.g., the Project would not expose sensitive receptors to pollutants, based on a Project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as Project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 17, "Earlier Analysis," may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c) (3) (d). In this case, a brief discussion should identify the following:

   (a) Earlier Analysis Used: Identify and state where they are available for review.

   (b) Impacts Adequately Addressed: Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   (c) Mitigation Measures: For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address Site-specific conditions for the Project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a Project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significance.

10) Have California Native American tribes traditionally and culturally affiliated with the Project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?

    Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and Project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.1 Aesthetics**<br>Except as provided in Public Resources Code Section 21099, would the Project: | | | | |
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* According to the City of Upland General Plan, there are no designated scenic views or vistas within the City.[8] Policy CC-1.6 of the Community Character Element of the City's General Plan requires development to enhance public view corridors of the San Gabriel Mountains, where feasible.[9]<br><br>Existing landscaping and residential structures situated on the golf course adjacent to the north of the Project Site currently obstruct views of the San Gabriel Mountains from the Project Site. Single-family residential uses occur south of the Project Site, across 15th Street, and development of 65 single-family residential homes on the Project Site north of 15th Street would not reach the height of the mature trees situated on the golf course adjacent to the north already obstructing views of the San Gabriel Mountains. Additionally, the Project Site contains a raised earthen berm with vegetation that further obstructs views of the San Gabriel Mountains from the south. Therefore, views from south of the Site would not be significantly altered from what currently exists.<br><br>In accordance with Policy CC-1.6 of the Community Character Element of the City's General Plan, development of the Proposed Project would introduce people [to the Site] who would have access to public view corridors of the San Gabriel Mountains, to the extent they occur through the golf course landscaping and existing residential uses, that would otherwise not be available to the public if the Site were to remain a flood control channel. Accordingly, the Project would have a **less than significant impact** on a scenic vista and no mitigation is required. | | | | |
| b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* No officially designated state scenic highways are located within the City. Roads of local scenic and historical interest include Euclid Avenue (State Route 83), Foothill Boulevard (State Route 66), Mountain Avenue, and Benson Avenue.[10] None of these roadways are located within the view shed of the Project Site.<br><br>Since no officially designated state scenic highways are located within the City, the Project would not substantially affect scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway. Impacts would be **less than significant** and no mitigation is required. | | | | |

[8] *Section 5.3 Aesthetics, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.3-6, City of Upland, September 2015.

[9] *Chapter 3 Community Character Element, City of Upland General Plan*, Pages CC-2 and CC-3, City of Upland, September 2015.

[10] *Section 5.3 Aesthetics, City of Upland General Plan Final Program Environmental Impact Report,* Pages 5.3-2 and 5.3-3, City of Upland, September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| c) Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publically accessible vantage points.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* The Project Site is currently vacant and serves as a flood control basin (15th Street Basin). Surrounding land uses comprise a golf course with residential uses adjacent to the north, a private residential community to the west, 15th Street beyond which are single-family residential uses to the south, and an extension of the existing 15th Street Basin beyond which are single-family and multifamily residential uses to the east.

The Project Site contains a raised earthen berm with vegetation, a basin to convey storm water flows, and earthen utility roads. Proposed improvements to the Project Site include rough grading and construction of curb and gutter, lighting, drainage, landscaping, and 65 single-family residential units in accordance with Section 2: Development Plan, Section 3: Development Regulations, and Section 4: Design Criteria of the Villa Serena Specific Plan.[11]

Goal LU-6 of the General Plan Land Use Element prescribes Policy LU-6.1 to ensure that development is attractive and promotes harmony in the visual relationships and transitions between newer and older buildings and Policy LU-6.2 to control the location, concentration and operations of land uses that have potential impacts on surrounding development through effective design principles, adequate buffering, and enforcement of regulatory documents. The new community planned as part of the Specific Plan incorporates the traditional housing styles of the City, while also reflecting the architecture of recently built neighborhoods in the Project vicinity. The use of Spanish roof tiles, gable end details, and delicate metal rails reflects the classic Spanish style of the historical Upland communities, while the vertical corner details, symmetry, and arched openings of the Italianate style, and the corbels, stone siding, and steep roof pitches of the French Country architectural style capture the details of the past and present styles of Upland homes.

Construction of new Project roadways and infrastructure is planned to connect to existing facilities located adjacent to the Project Site. The proposed plan utilizes existing circulation and transportation facilities, reducing the need for construction of additional arterial and major roadway extensions or improvements to serve the Project Site. Gateway design features will be constructed with drought-tolerant street trees, decorative landscaping, architectural features, welcome signs, decorative lighting, and other streetscape design techniques in accordance with Policy CC-4.1 of the Community Character Element of the City's General Plan[12] to provide a pleasant and integrated appearance.

The Site is located in an urbanized area. Project's development of the flood control detention basin

[11] *Villa Serena Specific Plan.* Frontier Communities. October 2018.
[12] *Chapter 3 Community Character Element, City of Upland General Plan*, Page CC-4, City of Upland, September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| with Single Family Residential – Medium (SFR-M) uses between existing single-family homes to the south and west and the golf course with multifamily homes (duplexes) to the north is consistent with the planned implementation of the SFR-M land use in transition zones between lower-density residential uses and higher-density commercial, industrial, and multifamily residential land uses, as detailed in the General Plan. Accordingly, no significant degradation to the visual character of the Site or the surrounding area would occur. **No impact** would occur and no mitigation is required. | | | | |
| d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* The Project Site is currently vacant and serves as a flood control basin (15th Street Basin), and the Proposed Project will develop the Site with 65 single-family, detached residential units as an infill Project surrounded by a golf course with residential uses adjacent to the north, a private residential community to the west, 15th Street beyond which are single-family residential uses to the south. The Project also includes an extension of the existing 15th Street Basin to the east of the proposed residential dwellings. The Proposed Project includes porch and threshold lighting on the residential units for both ambience and security, as well as street and pedestrian lighting at entrances, exists, pathways, and parking areas that would be commensurate with surrounding residential ambient day and nighttime illumination in the area. To reduce potential impacts from light or glare to less than significant levels, lighting will be shielded to minimize light spillage onto adjacent properties in accordance with Section 17.14.030, *General Standards* of the City's Municipal Code. Furthermore, outdoor lighting will comply with the State of California Title 24 Energy Efficiency Standards outdoor lighting requirements. If a conflict between the requirements of Chapter 17.14, *Outdoor Lighting* of the City Municipal Code and the State of California Title 24 Energy Efficiency Standards arises, that which produces the least glare shall apply, and light that results in glare is prohibited.<br><br>Additionally, the Proposed Project would not utilize high gloss or reflective materials that would cause glare or reflection from the Project Site. The Project would be subject to review and condition by the Development Services Department through the City's plan check process to ensure compliance with Chapter 17.14, *Outdoor Lighting* of the City Municipal Code. Through adherence to applicable City standards, the Project would not generate excessive light or glare. Impacts would be **less than significant** and no mitigation is required. | | | | |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

### 3.3.2 Agriculture and Forestry Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* Farmland maps are compiled by the California Department of Conservation, Farmland Mapping and Monitoring Program (FMMP), pursuant to the provisions of Section 65570 of the California Government Code. These maps utilize data from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) soil survey and current land use information and use eight mapping categories to represent an inventory of agricultural resources within San Bernardino County.

As classified by the FMMP, the Project Site is designated as "Urban and Built-up Land." As no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance[13] is located on site, no conversion of any such farmland would occur. **No impact** would occur and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local government to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agriculture or related open space use. In return, landowners receive property tax assessments much lower than normal because they are based upon farming and open space uses as opposed to full market value. The purpose of the Williamson Act is to encourage property owners to continue to farm their land and to prevent the premature conversion of farmland to urban uses.

The Project Site is currently functioning as a flood control basin and is surrounded by urban development. There are no Williamson Act properties within the City or the City's Sphere of Influence,[14] and the Project Site is not located within a Williamson Act contract area or an area

[13] *California Department of Conservation Farmland Mapping and Monitoring Program.* San Bernardino County Important Farmland 2016, Sheet 2 of 2. http://www.conservation.ca.gov/dlrp/fmmp/Pages/SanBernardino.aspx (accessed July 23, 2018).

[14] *Section 5.11 Agricultural Resources, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.11-5, City of Upland, September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| zoned for agriculture.[15] Therefore, the Proposed Project will not conflict with existing zoning for agricultural uses or with a Williamson Act Conservation Contract. **No impact** would occur and no mitigation is required. | | | | |
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | ☐ | ☐ | ☐ | ☒ |
| *No Impact*. The City does not contain forestry-related or timberland zoning. No forest land is located within or near the Project Site; therefore, no rezoning of forest land would occur. **No impact** would occur and no mitigation is required. | | | | |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| *No Impact*. As detailed in response to Checklist Question 3.3.2c, the City does not contain forestry-related or timberland zoning. No forest land is located within or near the Project Site; therefore, no conversion of forest land would occur. Because the Project will have **no impact** on loss of forest land or conversion of forest land to non-forest use. No mitigation is required. | | | | |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| *No Impact.* As no agricultural uses exist on-site, the Proposed Project would not result in the conversion of agricultural land to a non-agricultural use. Similarly, no forestry uses exist on site. In the absence of land designated for agricultural use or forestry use, **no impact** would occur. No mitigation is required. | | | | |
| **3.3.3 Air Quality**<br>Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the Project: | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* The Project Site is located in the South Coast Air Basin (Basin), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAQMD and the Southern California Association of Governments (SCAG) | | | | |

[15] *California Department of Conservation Farmland Mapping and Monitoring Program.* San Bernardino County Williamson Act FY 2015/2016, Sheet 2 of 2. ftp://ftp.consrv.ca.gov/pub/dlrp/wa/ (accessed July 23, 2018).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

are responsible for formulating and implementing the Air Quality Management Plan (AQMP), which has a 20-year horizon for the Basin. The SCAQMD and SCAG must update the AQMP every three years.

The current regional air quality plan is the Final 2016 AQMP adopted by the SCAQMD on March 10, 2017.[16] The Final 2016 AQMP proposes policies and measures currently contemplated by responsible agencies to achieve federal standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin that are under SCAQMD jurisdiction. The 2016 AQMP also addresses several federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The 2016 AQMP builds upon the approaches taken in the 2012 AQMP for the Basin for the attainment of the federal ozone air quality standard.[17] The Basin is currently a federal and State nonattainment area for particulate matter less than 10 microns in size ($PM_{10}$), particulate matter less than 2.5 microns in size ($PM_{2.5}$), and ozone ($O_3$).

The 2016 AQMP proposes attainment demonstration of the federal $PM_{2.5}$ standards through a more focused control of sulfur oxides (SOx), directly-emitted $PM_{2.5}$, nitrogen oxides (NOx), and volatile organic compounds (VOC). Consistency with the AQMP for the Basin means that a Project would be consistent with the goals, objectives, and assumptions in the respective plan to achieve the federal and State air quality standards. For a Project to be consistent with the AQMP adopted by the SCAQMD, the pollutants emitted from the Project should not exceed the SCAQMD daily threshold or cause a significant impact on air quality, or the Project must already have been included in the AQMP projections. However, if feasible mitigation measures are implemented and shown to reduce the impact level from significant to less than significant, a Project may be deemed consistent with the AQMP. The AQMP uses the assumptions and projections of local planning agencies to determine control strategies for regional compliance status. Since the AQMP is based on the local General Plan, Projects that are deemed consistent with the General Plan are found to be consistent with the AQMP.

The City's General Plan is consistent with the SCAG Regional Comprehensive Plan Guidelines and the SCAQMD AQMP. However, the Proposed Project includes a GPA from Public Utilities--Flood Control/ Recharge (PU-FC/R) to Villa Serena Specific Plan (SP). The City's General Plan and the AQMP assumed the current Public Utilities--Flood Control/Recharge designation in its air quality emission estimates. The emissions associated with the proposed Single-Family Residential-Medium Density development were not included in the City's land use projections; therefore, the AQMP also does not anticipate emissions from the Proposed Project's land uses.

Pursuant to the methodology provided in Chapter 12 of the 1993 SCAQMD *CEQA Air Quality Handbook*, consistency for Project development proposals that differ from the land use designation assumed within the Basin's 2016 AQMP is affirmed when a Project: (1) does not increase the frequency or severity of an air quality standards violation or cause a new violation; and (2) is consistent with the growth assumptions in the AQMP. Consistency review is presented below:

[16] *Final 2016 Air Quality Management Plan*. South Coast Air Quality Management District, March 2016.
[17] *Final 2012 Air Quality Management Plan,* South Coast Air Quality Management District, February 2013.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

1. The Project would result in short-term construction and long-term pollutant emissions that are less than the CEQA significance emissions thresholds established by the SCAQMD, as demonstrated in response to Checklist Question 3.3.3b; therefore, the Project would not result in an increase in the frequency or severity of any air quality standards violation and would not cause a new air quality standard violation.
2. The *CEQA Air Quality Handbook* indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant Projects. Significant Projects include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal Sites, and offshore drilling facilities; therefore, the Proposed Project is not defined as significant.

   As detailed in response to Checklist Question 3.3.13a, the Project is located in a predominantly developed area and would include the construction of 65 single-family residential dwelling units. The latest statistical figures published by SCAG for the City's average household size assume 2.9 persons per housing unit,[18] so the Proposed Project could increase the City's population by approximately 189 persons.

   The City's 2012 jobs-to-housing ratio is well above the San Bernardino County job/housing ratio but slightly lower than the SCAG regional job/housing ratio; therefore, the City may be considered "jobs balanced" relative to the greater SCAG region. By 2040, however, the City's jobs-to-housing is expected to exceed both the County's and SCAG's jobs-to-housing ratios, as detailed in Table 3.3.13A, meaning the City would be relatively "jobs rich" and "housing poor," and additional housing within the City would be required to balance the jobs-to-housing ratio at the local level. By developing housing, the Project would support the balance of jobs to housing in the City so that residents would not have to travel far to work. Therefore, a balanced jobs-to-housing ratio generally fulfills several key issues and policies of the AQMP through the reduction in regional vehicle miles traveled (VMT) in order to reduce vehicle emissions.

Through adherence to standard SCAQMD regional rules required for all development activity with the Basin that assist in reducing air pollutant emissions, the Proposed Project would not conflict with or obstruct implementation of the AQMP. Impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* The SCAQMD's CEQA *Air Quality Handbook* establishes suggested significance thresholds based on the volume of pollution emitted. According to the *Handbook*, any Project in the Basin with daily emissions that exceed any of the following thresholds should be considered as having an individually and cumulatively significant air

[18] *Profile of the City of Upland.* Page 3. Southern California Association of Governments Local Profiles Report 2017. May 2017.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

quality impact:

- 55 lbs. per day of VOC (volatile organic compounds) (75 lbs./day during construction);
- 55 lbs. per day of NOx (oxides of nitrogen) (100 lbs./day during construction);
- 550 lbs. per day of CO (carbon monoxide) (550 lbs./day during construction);
- 150 lbs. per day of $PM_{10}$ (particulate matter with a diameter of 10 microns or smaller) (150 lbs./day during construction)
- 55 lbs. per day of $PM_{2.5}$ (particulate matter with a diameter of 2.5 microns or smaller) (55 lbs./day during construction); and
- 150 lbs. per day of SOx (oxides of sulfur) (150 lbs./day during construction).

The following analysis is based on the Air Quality Analysis prepared for the Project (refer to Appendix A of this Initial Study).[19]

**Construction Emissions.** Air quality impacts would occur during Site preparation and construction. Major sources of emissions include exhaust emissions from construction vehicles and equipment and fugitive dust generated by construction vehicles and equipment traveling over exposed surfaces, as well as by soil disturbances from grading and filling. Grading and construction activities would cause combustion emissions from utility engines, heavy-duty construction vehicles, haul trucks, and vehicles transporting the construction crew. Fugitive dust emissions are generally associated with land clearing, exposure of soils, and cut and fill operations.

Emissions during grading and construction activities would vary as construction activity levels change. For the purposes of analyzing construction emissions, the Project will be constructed in five phases, as detailed in Table 3.3.3A.

**Table 3.3.3A: Tentative Project Construction Schedule**

| Phase Number | Phase Name | Number of Days |
|---|---|---|
| 1 | Site Preparation | 10 |
| 2 | Grading | 20 |
| 3 | Building Construction | 230 |
| 4 | Paving | 20 |
| 5 | Architectural Coating | 20 |

Source: Table 3-2, *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018. (Appendix A).

Construction is expected to commence in December 2019 and will last through December 2020. According to information provided by the Applicant, the Project Site is expected to require an estimated 40,000 cubic yards of import. Table 3.3.3B lists the anticipated construction equipment to be used during Project construction under each Project phase.

The duration of construction activity and associated construction equipment assumptions were entered into the California Emissions Estimator Model (CalEEMod) 2016.3.2. The construction calculations prepared for the Project assume that dust control measures (e.g., watering a minimum of three times daily) would be employed to reduce emissions of fugitive dust during Site grading.

[19] *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018 (Appendix A).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

Furthermore, all construction would need to comply with SCAQMD Rule 403 regarding the reduction of emission of fugitive dust and SCAQMD Rule 1113 regarding the use of only "Low-Volatile Organic Compounds" paints as a matter of regulatory policy.

**Table 3.3.3B: Diesel Construction Equipment Utilized by Construction Phase**

| Construction Phase | Off-Road Equipment Type | Off-Road Equipment Unit Amount | Hours Used per Day |
|---|---|---|---|
| Site Preparation | Crawler Tractors | 4 | 8 |
| | Rubber Tired Dozers | 3 | 8 |
| Grading | Crawler Tractors | 3 | 8 |
| | Excavators | 1 | 8 |
| | Graders | 1 | 8 |
| | Rubber Tired Dozers | 1 | 8 |
| Building Construction | Cranes | 1 | 8 |
| | Crawler Tractors | 3 | 8 |
| | Forklifts | 3 | 8 |
| | Generator Sets | 1 | 8 |
| | Welders | 1 | 8 |
| Paving | Paving Equipment | 2 | 8 |
| | Rollers | 2 | 8 |
| | Pavers | 2 | 8 |
| Architectural Coating | Air Compressors | 1 | 8 |

Source: Table 3-3, *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018 (Appendix A).

Among the requirements of SCAQMD Rule 403, fugitive dust must be controlled so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. Adherence to Rule 403 is a standard requirement for any construction activity occurring within the SCAQMD. Adherence to applicable provisions of Rule 403, including the implementation of Best Available Control Measures (BACMs) can reduce fugitive dust emissions by 50 percent or more. These measures may include, but are not limited to:

- All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 miles per hour per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project Site areas are reduced to 15 miles per hour or less.

Among the requirements of SCAQMD Rule 1113, only "Low-Volatile Organic Compounds" paints comprising no more than 50 gram/liter of VOC and/or High Pressure Low Volume (HPLV) applications shall be used during construction of the Project.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

Table 3.3.3C identifies the maximum daily emissions associated with construction activities assuming the Project would incorporate the applicable provisions of SCAQMD Rule 403 to control fugitive dust and SCAQMD Rule 1113 to reduce VOCs.

**Table 3.3.3C: Short-Term Regional Construction Emissions without Mitigation**

| Year | Total Regional Pollutant Emissions, lbs./day | | | | | |
|---|---|---|---|---|---|---|
| | VOC | NOx | CO | SOx | $PM_{10}$ | $PM_{2.5}$ |
| 2019 | 5.94 | 111.75 | 28.68 | 0.24 | 11.04 | 6.75 |
| 2020 | 49.91 | 14.12 | 15.21 | 0.02 | 0.92 | 0.74 |
| **Maximum Daily Emissions** | **49.91** | **111.75** | **28.68** | **0.24** | **11.04** | **6.75** |
| SCAQMD Regional Thresholds | 75 | 100 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **No** | **Yes** | **No** | **No** | **No** | **No** |

Source: Table 3-4, *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018 (Appendix A).

CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
$PM_{10}$ = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
SCAQMD = South Coast Air Quality Management District
SOx = sulfur oxides
VOC = volatile organic compounds

As detailed in Table 3.3.3C, Project construction activities have the potential to exceed numerical thresholds established by the SCAQMD for emissions of NOx, and mitigation is required.

**Mitigation Measure AQ-1** is required to reduce emissions of Oxides of Nitrogen (NOx) to within the numerical thresholds of significance established by the SCAQMD.

**AQ-1** Prior to issuance of grading permits and/or construction permits, the Applicant shall provide to the City verification that all off-road diesel construction equipment greater than 150 horsepower (>150 HP) to be used for the Project shall comply with the Environmental Protection Agency (EPA)/California Air Resources Board (CARB) Tier 3 emissions standards during all construction phases. During construction, the City shall ensure that all construction equipment be tuned and maintained in accordance with the manufacturer's specifications. This measure shall be implemented to the satisfaction of the City Planning Division.

As detailed in Table 3.3.3D, upon implementation of **Mitigation Measure AQ-1**, all Project construction-source emissions will be reduced to l**ess than significant** levels.

Localized Significance Thresholds (LSTs) are developed based upon the size or total area of the emissions source from the construction equipment activities, the ambient air quality levels in each source receptor area (SRA) in which the emission source is located, and the distance to the sensitive receptor. LSTs represent the maximum emissions from a Project that would not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each SRA. For the Proposed Project, the appropriate SRA for the LST is SRA 32 (Northwest San Bernardino Valley).

The SCAQMD LST methodology presents mass emission rates for each SRA, Project sizes of 1, 2, and 5 acres, and nearest receptor distances of 82, 164, 328, 656, and 1640 feet (25, 50, 100, 200, and

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

500 meters). For Project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to construct new data points within the range of the values given or distances measured in order to determine the thresholds.

**Table 3.3.3D: Short-Term Regional Construction Emissions with Mitigation**

| Year | Total Regional Pollutant Emissions, lbs./day | | | | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| 2019 | 2.91 | 87.30 | 36.05 | 0.24 | 9.10 | 5.04 |
| 2020 | 49.91 | 14.12 | 15.21 | 0.02 | 0.92 | 0.74 |
| **Maximum Daily Emissions** | **49.91** | **87.30** | **36.05** | **0.24** | **9.10** | **5.04** |
| SCAQMD Regional Thresholds | 75 | 100 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** | **No** | **No** |

Source: Table 3-5, *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018 (Appendix A).

CO = carbon monoxide
lbs/day = pounds per day
$NO_X$ = nitrogen oxides
$PM_{10}$ = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
SCAQMD = South Coast Air Quality Management District
$SO_X$ = sulfur oxides
VOC = volatile organic compounds

Localized significance is determined by comparing the on-site-only portion of the construction emissions with emissions thresholds derived by the SCAQMD to ensure pollutant concentrations at nearby sensitive receptors would be below ambient air quality standards established by the SCAQMD. Based on the SCAQMD recommended methodology and the construction equipment planned, the Proposed Project could actively disturb approximately 3.5 acres per day during the Site preparation, and 2.5 acres per day during the grading phase of construction. Since the total acreage disturbed is less than or equal to 5 acres per day for both the Site preparation phase and the grading phase, the SCAQMD's screening look-up tables are utilized in determining impacts.

The nearest sensitive receptors in proximity to the Project Site are single-family residential uses located approximately 10 feet to the west of the Project construction limits. For instances where sensitive receptors are located within 82 feet of Project boundaries, SCAQMD methodology explicitly states LSTs for receptors at 82 feet should be used to determine impacts. Table 3.3.3E lists the emissions thresholds for SRA 32 that would apply during Project construction and indicates that none of the construction emission rates would exceed the LSTs for the existing sensitive receptors in proximity to the Project Site. **No impact** would occur and no mitigation is required.

As detailed in Tables 3.3.3D and 3.3.3E, with implementation of the applicable provisions of SCAQMD Rule 403 to control fugitive dust and SCAQMD Rule 1113 to reduce VOCs, as well as Mitigation Measure AQ-1, emissions generated through construction of the Proposed Project would not exceed SCAQMD thresholds for regional construction emissions or LSTs for the existing sensitive receptors in proximity to the Project Site. No impact would occur and no mitigation is required.

Operational Emissions. Long-term (operational) air pollutant emissions are those associated with area sources, stationary sources, and mobile sources involving any Project-related changes. Area sources include architectural coatings, consumer products, hearths, and landscaping. Energy sources include natural gas consumption for heating and cooking. Mobile-source emissions usually result from vehicle

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

trips associated with a Project. Vehicle trip rates used to calculate Project operation emissions are garnered from the Project-specific Traffic Impact Analysis (refer to Section 3.3.16 and Appendix I).

**Table 3.3.3E: Construction Localized Impact Analysis**

| On-Site Site Preparation Emissions | Pollutant Emissions (lbs/day) | | | |
|---|---|---|---|---|
| | **NOx** | **CO** | **$PM_{10}$** | **$PM_{2.5}$** |
| Maximum Daily Emissions | 68.11 | 23.14 | 10.84 | 6.69 |
| SCAQMD Localized Thresholds | 220 | 1,713 | 11 | 7 |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** |
| **On-Site Grading Emissions** | **Pollutant Emissions (lbs/day)** | | | |
| | **NOx** | **CO** | **$PM_{10}$** | **$PM_{2.5}$** |
| Maximum Daily Emissions | 45.25 | 17.10 | 5.10 | 3.08 |
| SCAQMD Regional Thresholds | 187 | 1,392 | 8 | 6 |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** |

Source: Table 3-8, *Upland Colonies Air Quality Impact Analysis, City of Upland.* Urban Crossroads. August 2018 (Appendix A).

CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$PM_{10}$ = particulate matter less than 10 microns in size

**Table 3.3.3F: Maximum Daily Operational Emissions Summary**

| Operational Activities - Summer Scenario | Pollutant Emissions, lbs/day | | | | | |
|---|---|---|---|---|---|---|
| | **VOC** | **NOx** | **CO** | **SOx** | **$PM_{10}$** | **$PM_{2.5}$** |
| Area Source | 3.70 | 1.16 | 5.93 | 0.01 | 0.12 | 0.12 |
| Energy Source | 0.06 | 0.51 | 0.22 | 0.00325 | 0.04 | 0.05 |
| Mobile | 1.55 | 9.73 | 18.66 | 0.07 | 4.64 | 1.28 |
| **Total Maximum Daily Emissions** | **5.31** | **11.40** | **24.80** | **0.08** | **4.80** | **1.44** |
| **SCAQMD Regional Thresholds** | **55** | **55** | **550** | **150** | **150** | **55** |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** | **No** | **No** |
| **Operational Activities - Winter Scenario** | **Pollutant Emissions, lbs/day** | | | | | |
| | **VOC** | **NOx** | **CO** | **SOx** | **$PM_{10}$** | **$PM_{2.5}$** |
| Area Source | 3.70 | 1.16 | 5.93 | 0.01 | 0.12 | 0.12 |
| Energy Source | 0.06 | 0.51 | 0.22 | 0.00325 | 0.04 | 0.05 |
| Mobile | 1.36 | 9.79 | 16.35 | 0.06 | 4.64 | 1.28 |
| **Total Maximum Daily Emissions** | **5.12** | **11.46** | **22.50** | **0.07** | **4.80** | **1.44** |
| **SCAQMD Regional Thresholds** | **55** | **55** | **550** | **150** | **150** | **55** |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** | **No** | **No** |

Source: Table 3-6 *Upland Colonies Air Quality Impact Analysis, City of Upland*. Urban Crossroads. August 2018 (Appendix A).

CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
$PM_{10}$ = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SOx = sulfur oxides
VOC = volatile organic compounds

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

Long-term emissions were calculated for VOC, NOx, CO, SOx, $PM_{10}$, and $PM_{2.5}$ expected to be generated through operation of the Proposed Project. As detailed in Table 3.3.3F, calculated Project-related emissions would not exceed the established SCAQMD daily emission thresholds for any criteria pollutants. No significant long-term regional air quality impact would occur.

The Proposed Project involves the construction and operation of 65 single-family residential dwelling units on 9.16 acres. According to SCAQMD LST methodology, LSTs would apply to the operational phase of a Proposed Project if the Project includes stationary sources or attracts mobile sources that may spend long periods of time queuing and idling at the Site (e.g., transfer facilities and warehouse buildings). The Proposed Project does not include such uses. Accordingly, no long-term localized significance threshold analysis is required due to the lack of significant stationary source emissions. Therefore, the proposed operational activity would not result in a locally significant air quality impact.

Areas with high vehicle density (e.g., congested intersections and parking garages) have the potential to create high concentrations of CO known as CO "hotspots." A Project's localized air quality impact is considered significant if CO emissions create a hotspot where either the California 1-hour standard of 20 ppm or the federal and state 8-hour standard of 9.0 ppm is exceeded. This typically occurs at severely congested intersections (level of service [LOS] E or worse). Based on the Project-specific Traffic Impact Analysis (refer to Section 3.3.16 and Appendix I), all study area intersections are anticipated to operate at acceptable levels of service for all Project scenarios. Therefore, the Project is not anticipated to create a CO hotspot. Potential impacts from CO emissions are considered **less than significant**.

The Proposed Project is required to comply with SCAQMD Rule 403 (Fugitive Dust), Rule 1113 (Architectural Coatings), Rule 431.2 (Low Sulfur Fuel), and Rule 1186/1186.1 (Street Sweepers). As stated previously, Best Available Control Measures are not mitigation, as they are standard regulatory requirements applicable to all Projects in the Basin. Notwithstanding, credit for implementation of SCAQMD Rules 403 and 1113 have been incorporated in the emissions calculations presented above.

Tables 3.3.3D through 3.3.3F demonstrate that compliance with applicable regulatory policy designed to reduce emissions, as well as implementation of **Mitigation Measure AQ-1**, will reduce emissions of criteria pollutants to levels below SCAQMD thresholds during construction. Cumulative construction-related quality cumulative impacts would be **less than significant with mitigation incorporated**.

| | | | | |
|---|---|---|---|---|
| c) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact*. The SCAQMD recommends the evaluation of localized NOx, CO, $PM_{10}$, and $PM_{2.5}$ concentration-related impacts to sensitive receptors in the immediate vicinity of the Project Site. Sensitive receptors include but are not limited to residential land uses, schools, hospitals, resident care facilities, daycare facilities, or other facilities that may house individuals with health conditions that would be affected by poor air quality.

The Project Site is currently functioning as a flood control basin and is surrounded by urban

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

development. The nearest sensitive receptors in proximity to the Project Site are single-family residential uses located approximately 10 feet to the west of the Project construction limits. For instances where sensitive receptors are located within 82 feet of Project boundaries, SCAQMD methodology explicitly states LSTs for receptors at 82 feet should be used to determine impacts. Table 3.3.3E lists the emissions thresholds for SRA 32 that would apply during Project construction and indicates that none of the construction emission rates would exceed the LSTs for the existing sensitive receptors in proximity to the Project Site.

According to SCAQMD LST methodology, LSTs would apply to the operational phase of a Proposed Project if the Project includes stationary sources or attracts mobile sources that may spend long periods of time queuing and idling at the Site (e.g., transfer facilities and warehouse buildings). The Proposed Project entails the development of 65 single-family residential dwelling units and does not include development of any uses that would emit substantial amounts of pollutants from stationary sources or that would attract mobile sources that may spend long periods of time queuing and idling at the Site (e.g., transfer facilities and warehouse buildings). Accordingly, no long-term localized significance threshold analysis is required due to the lack of significant stationary source emissions. Therefore, the proposed operational activity would not result in a locally significant air quality impact.

Both short-term (i.e., construction) and long-term (i.e., operational) LST air quality impacts would be **less than significant**. No mitigation is required.

| | | | | |
|---|---|---|---|---|
| d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact*. Objectionable odors may be emitted during the operation of diesel-fueled equipment during construction of the Project. However, these odors would be short term in duration and are expected to be isolated to the immediate vicinity of the construction Site. SCAQMD Rules 402 and 403, and Title 13, Section 2449(d)(d) of the California Code of Regulations, require the Applicant to include implementation of standard control measures for fugitive dust and construction equipment emissions. Additionally, operators of off-road vehicles (i.e., self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on road) are required to limit vehicle idling to five minutes or less. Therefore, operation of diesel-fueled equipment would not expose a substantial number of people to objectionable odors on a permanent basis. During construction, on-site activities (e.g., laying asphalt) could create odors. These odors are temporary and not likely to be noticeable beyond the Project boundaries. SCAQMD Rule 1108 identifies standards regarding the application of asphalt. Adherence to this rule is a standard for all development, and temporary odor impacts would be less than significant. Long-term odors are not expected to occur because the Project involves development and operation of 65 single-family residential dwelling units in an area of the City currently comprising residential uses for the majority of the immediately surrounding land uses. The Project does not include uses commonly associated with long-term operational odors such as landfills, heavy manufacturing facilities, and rail yards. Therefore, the Project would have a **less than significant** impact related to odors and no mitigation is required.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.4 Biological Resources**<br>Would the Project: | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* The Project Site is currently vacant and serves as a flood control basin (15th Street Basin). Surrounding land uses are comprised of a golf course with residential uses adjacent to the north, a private residential community to the west, 15th Street beyond which are single-family residential uses to the south, and an extension of the existing 15th Street Basin beyond which are single-family and multifamily residential uses to the east.

A Project-specific Biological Resources Assessment (Appendix B) consisting of a literature review, records search, general biological survey, and habitat assessment for burrowing owl (*Athene cunicularia*) was conducted for the Project Site and included coverage of the proposed footprint of the relocated flood control basin adjacent to the east of the Project Site. The literature review and records search included the California Department of Fish and Wildlife (CDFW) Natural Diversity Data Base (NDDB) Rarefind 5 (2017) for the *Ontario, California* U.S. Geological Survey (USGS) 7.5-minute quadrangle. The general biological survey and habitat assessment for burrowing owl was conducted on July 10, 2018, and focused on general Site conditions, vegetation, potential jurisdictional waters, and suitability of habitat for various special-status species including the burrowing owl.

No sensitive biological resources (e.g., sensitive species and critical habitats) have been documented in the immediate area according to the CDFW NDDB. No special-status plant or wildlife species were observed during the survey.

Vegetation on the Project Site consists primarily of buckwheat shrubland community comprised of California buckwheat (*Eriogonum fasciculatum*), prickly-pear (*Opuntia* spp.), deerweed (*Acmispon glaber*), California broomsage (*Lepidospartum squamatum*), California yerba santa (*Eriodictyon californicum*), brome grasses (*Bromus* sp.), annual bursage (*Ambrosia acanthicarpa*), and schismus (*Schismus barbatus*). On the northern border of the Site is a row of non-native trees that encroaches onto the Site from the adjacent golf course.

Wildlife common to urban areas was observed throughout the Project Site, including cottontail rabbits (*Sylvilagus audubonii*), California ground squirrel (*Otospermophilus beecheyi*), ravens (*Corvus corax*), house finch (*Carpodacus mexicanus*), rock pigeon (*Columba livia*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), white-crowned sparrow (*Zonotrichia leucophrys*), alligator lizard (*Elgaria* sp.), side-blotched lizard (*Uta stansburiana*), and western whiptail lizard (*Cnemidophorus tigris*). Additionally, coyotes (*Canis latrans*), which are very common in the region, are expected to occur on site.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

As indicated above, a habitat assessment was conducted for the burrowing owl in conjunction with the general biological survey to determine if the Site supports suitable habitat for burrowing owl. The Project Site does not contain habitat suitable to support burrowing owl, so a focused survey for burrowing owl is not required. Additionally, no sensitive habitats (e.g., wetlands, vernal pools, or critical habitats for sensitive species) were observed on the Site during the field investigations for any other candidate, sensitive, or special-status species. Therefore, the Proposed Project is not expected to result in loss of suitable habitat for any special-status species with potential to occur.

Nesting bird species observed are protected by California Fish and Game Code Sections 3503, 3503.5, and 3800, and by the Migratory Bird Treaty Act (MBTA) (16 USC 703–711). These laws regulate the take, possession, or destruction of the nest or eggs of any migratory bird or bird of prey such as burrowing owl. Vegetation, including trees, may provide nesting habitat for birds protected under the California Fish and Game Code (Sections 3503, 3503.5, and 3515), and construction activities may adversely affect such birds. This is a potentially significant impact, and mitigation is required.

**Mitigation Measure BIO-1** requires that burrowing owl and nesting bird pre-construction clearance surveys be conducted prior to any ground-disturbing activities.

**BIO-1** A Burrowing owl and nesting bird pre-construction clearance survey shall be conducted within three days prior to ground-disturbing activities. The survey shall encompass the entire area of Project-related ground disturbance. If no active avian nests and no burrowing owls are found during the clearance survey, no additional mitigation will be required.

If a special-status species is located during the survey, consultation with the local California Department of Fish and Wildlife (CDFW) representative shall occur to determine what avoidance actions are required. If an active avian nest is discovered during the pre-construction clearance survey, construction activities shall be redirected around the nest(s). As determined by the City Planning Division, a qualified biologist shall delineate the boundaries of any such buffer area. The buffer shall be sufficient to ensure that nesting behavior is not adversely affected by the construction activity. For listed and raptor species, this buffer may be expanded to up to 500 feet from the active nest at the discretion of the qualified biologist in consultation with the City Planning Division and CDFW.

The biologist shall have the authority to temporarily halt construction if it occurs within an established avian buffer or if new nesting activity occurs and a new buffer is required. Encroachment into buffers around active nests must be conducted only at the discretion of the biologist. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, construction activities within the buffer area may occur or resume at the discretion of the qualified biologist in consultation with the City Planning Division and CDFW. Upon completion of construction monitoring, the biologist shall prepare a report of findings documenting the results of the recommended protective measures described above to document compliance with applicable State and federal laws pertaining to the protection of nesting birds. This measure shall be implemented to the satisfaction of the City Planning Division.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| With implementation of **Mitigation Measure BIO-1**, the Proposed Project would have a **less than significant impact** on burrowing owls, nesting birds, and any other species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. | | | | |
| b) Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | ☒ |
| *No Impact.* The Project Site and adjoining areas were evaluated for the presence of sensitive habitats including riparian habitats as part of the Project-specific Biological Resources Assessment. No riparian vegetation or other sensitive habitats were observed during the July 2018 surveys; therefore, **no impact** on such habitats would occur. No mitigation is required. | | | | |
| c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ☒ |
| *No Impact.* The Project-specific Biological Resources Assessment did not identify any wetland habitat on-site or in adjoining areas. Therefore, **no impact** on such habitat would occur. No mitigation is required. | | | | |
| d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated.* The Project Site is surrounded by residential development and a golf course dominated by habitats that have been altered by Site development and ornamental landscaping. Implementation of the Proposed Project would result in the removal of native buckwheat shrubland community that could support nesting activities and provide periodic roosting or perching opportunities for birds including burrowing owls. Protection for burrowing owls and other migratory nesting birds is provided through implementation of **Mitigation Measure BIO-1.**<br><br>Due to the developed nature of the properties surrounding the Project Site, connectivity of natural habitats does not occur on-site or in the immediate vicinity, and the Project Site does not act as a wildlife corridor or contain nursery sites. Little or no local wildlife movement is expected to occur through the Project Site except for nesting or foraging birds and small reptile and small mammal (rodent/coyote) species. Through implementation of **Mitigation Measure BIO-1,** impacts to movement of any native resident or migratory fish or wildlife species or established native resident or migratory wildlife corridors or nursery sites would be reduced to **less than significant** levels. | | | | |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* City Municipal Code Section 12.24.100, *Tree removal - Permit* prohibits tree removal within the City without a permit from the City Manager. On the northern border of the Site is a row of non-native trees that encroaches onto the Site from the adjacent golf course. Any trees to be removed during construction of the Project would occur in accordance with Section 12.24.100 of the City Municipal Code. Additionally, all street tree plantings will occur pursuant to City Municipal Code Chapter 12.26, *Tree Care* to ensure implementation of the Proposed Project will not conflict with any local policies or ordinances protecting biological resources, including any tree preservation policy or ordinance. Therefore, a **less than significant impact** would occur and no mitigation is required. | | | | |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ☒ |
| *No Impact*. The City, and therefore the Project Site, is not located within the jurisdiction of any Habitat Conservation Plan area or Natural Community Conservation Plan area;[20] therefore, **no impact** related to this issue would occur. No mitigation is required. | | | | |
| **3.3.5 Cultural Resources**<br>Would the Project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as pursuant to Section 15064.5? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated.* Please refer to the response to Checklist Question 3.3.5b below. | | | | |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated.* A "historical resource" includes, but is not limited to, any object, building, Site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.[21] CEQA mandates that Lead Agencies consider a resource to be "historically significant" if it meets the criteria for listing in the California Register of Historical Resources (California Register). Such resources meet this requirement if they are (1) associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States, (2) | | | | |

[20] *Section 8.0 Effects Found Not To Be Significant, City of Upland General Plan Final Program Environmental Impact Report,* Page 8-2, City of Upland, September 2015.

[21] Public Resources Code, Section 5020.1(j).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

associated with the lives of persons important to local, California or national history, (3) embody the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values, and/or (4) have yielded, or have the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

A Project-specific Cultural Resources Assessment was conducted for the Project Site and included a Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC), communication with Native American tribal representatives, an archaeological and historical records search, and an intensive pedestrian survey of the Project Site and proposed footprint of the relocated flood control basin adjacent to the east of the Project Site (Appendix C).

The NAHC indicated the SLF did not include any known cultural resources on the Project Site or immediate vicinity. Notification of the Proposed Project was disseminated to the 10 Native American Tribes listed with the NAHC. Two Tribes, the San Manuel Band of Mission Indians and the Gabrieleño Band of Mission Indians-Kizh Nation replied. The San Manuel Band of Mission Indians stated the Project Site is within Serrano ancestral territory, but the location and condition of the Site does not concern the Tribe. The Gabrieleño Band of Mission Indians-Kizh Nation expressed interest in the Project and wishes to consult with the City. Additional discussion of Native American consultation with the City for this Project is provided in Section 3.3.17 of this Initial Study.

The records search conducted on June 26, 2018, at the South Central Coastal Information Center (SCCIC) revealed nine cultural resources investigations have been conducted within one-half mile of the Project Site, two of which encompassed the Project Site. The records search also revealed three cultural resources were previously recorded within one-half mile of the Project Site, but none of those resources is located within or adjacent to the Project Site. The three cultural resources recorded within one-half mile of the Project Site include a prehistoric groundstone assemblage (P-36-000899), a water conveyance system and associated structures (P-36-006255), and Base Line Road (P-36-015497).

The pedestrian survey of the Project Site failed to identify any prehistoric **or** historical archaeological remains or built-environment resources. Results of the survey indicate that the surface of entire Project Site has been disturbed by the establishment of a flood control basin. Nevertheless, five shovel test pits were excavated, each to a depth of approximately one foot (30 centimeters), to further examine the Project Site for the presence of buried cultural resources. The shovel test pits failed to identify any prehistoric or historical archaeological remains or built-environment resources. Therefore, the likelihood of any historical or archaeological resources occurring on the Project Site is low.

Despite the low likelihood any cultural resources are present at the Project Site, there remains some potential for the Proposed Project to unearth previously undocumented cultural resources during earthwork activities associated with construction. Therefore, **Mitigation Measure CUL-1** and is required in the event that unanticipated cultural resources are unearthed on the Project Site.

**CUL-1** In the event that pre-contact cultural resources are discovered during project activities, all work in the immediate vicinity of the of the find (within a 100-foot buffer) shall cease and a qualified archaeologist meeting Secretary of the Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

continue during this assessment period. Additionally, the San Manuel Band of Mission Indians (SMBMI) Cultural Resource Department shall be contacted as detailed within **Mitigation Measure TCR-1**, if any such find occurs and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regard to significance and treatment.

If significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to the SMBMI for review and comment, as detailed in **Mitigation Measure TCR-1**. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code Section 7050.5 and that code enforced for the duration of the project.

With implementation of **Mitigation Measure CUL-1**, potential impacts to historical and archaeological resources would be reduced to a **less than significant** level.

| | | | | |
|---|---|---|---|---|
| c) Disturb any human remains, including those interred outside of dedicated cemeteries? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* There is no evidence to suggest the Project Site has been used for human burials. The California Health and Safety Code (Section 7050.5) states that if human remains are discovered on site, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be prehistoric, the [San Bernardino] County Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the Site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Because State regulations address unanticipated discoveries of human remains, mitigation measures intended to reiterate such an effort are not required. Adherence to State regulations required for all development Projects will ensure potential impacts to human remains would be **less than significant**. No mitigation is required.

### 3.3.6 Energy

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* During project operation, electricity would be the main form of energy consumed on the site. Electricity would be used for building heating and cooling, lighting, and water

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

heating. The project would demand a total of 434,460 kilowatt hours (kWh) of electricity and 1.636 million British thermal units (Btu) of natural gas on an annual basis.

The State of California provides a minimum standard for building design and construction standards through Title 24 of the CCR, known as the California Building Code (CBC). The CBC is updated every three years, and compliance with Title 24 is mandatory at the time new building permits are issued by local governments. The California Building Standards Commission (CBSC) adopted Part 11 of the Title 24 Building Energy Efficiency Standards (also referred to as the California Green Building Standards Code, or CALGreen) in 2010 as part of the State's efforts to reduce greenhouse gas (GHG) emissions and energy consumption from residential and nonresidential buildings. CALGreen code covers the following five categories: (1) planning and design, (2) energy efficiency, (3) water efficiency and conservation, (4) material conservation and resource efficiency, and (5) indoor environmental quality. The City has adopted both the CBC and CALGreen Code as pertaining to energy conservation standards.

The project would comply with the CALGreen Code requirements and Title 24 efficiency standards**,** which would further improve energy efficiency during operation. Electricity is provided in the State through a complex grid of power plants and transmission lines and is delivered locally by Southern California Edison. In 2017, California's in-state electric generation totaled 194,727 gigawatt-hours (GWh); the State's total system electric generation, which includes imported electricity, totaled 285,488 GWh.[22] Population growth is the primary source of increased energy consumption in the State; due to population projections, annual electricity use is anticipated to increase by approximately 1 percent per year through 2027.[23] The project's electricity usage would total less than 0.00006 percent[24] of electricity generated in the State in 2018, which would not represent a substantial demand on available electricity resources. The project's usage of natural gas is less than 0.00013 percent of total natural gas consumed in the State (2017).

Construction and operation of the proposed project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. Consumption of energy resources as a result of implementation of the proposed project would be comparable to other developments in the City. Impacts would be **less than significant** and no mitigation is required.

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| b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* The project would be required to comply with CBC and CALGreen Code in accordance with Title 11 (Zoning and Development) of the City Municipal Code pertaining to energy conservation standards in effect at the time of construction. These regulations include provisions related to building insulation and design aimed at minimizing energy consumption. Therefore, the proposed project would be consistent with applicable plans related to renewable energy and energy efficiency. Impacts would be **less than significant** and no mitigation is required.

[22] *Total System Electric Generation*. California Energy Commission. https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html (accessed April 5, 2019).

[23] https://ww2.energy.ca.gov/almanac/electricity_data/electric_generation_capacity.html (accessed October 7, 2019).

[24] 0.120 GWh (proposed project) ÷ 194,727 GWh (generated in State in 2018) = < 0.00005 percent.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.7 Geology and Soils**<br>Would the Project: | | | | |
| a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:<br>(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.<br>(ii) Strong seismic ground shaking?<br>(iii) Seismic-related ground failure, including liquefaction?<br>(iv) Landslides? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.*

(i) According to the City's General Plan EIR, the Project Site is not located within an Alquist-Priolo Fault Zone.[25] The Project-specific Geotechnical and Infiltration Evaluation (Appendix D) identify the Sierra Madre fault approximately 2.6 miles to the north and the Red Hill-Etiwanda fault approximately 5.3 miles to the northeast as the nearest active faults in relation to the Project Site.[26] In the absence of any on-site faults, the potential for ground rupture is considered **less than significant**.

(ii) Like all of Southern California, the Project Site could be subject to strong ground shaking resulting from large earthquakes. The extent of ground shaking associated with an earthquake is dependent upon the size of the earthquake and the geologic material of the underlying area. All future construction and development within the Project Site would be required to comply with applicable provisions of the most current edition of the California Building Code (CBC) at the time of construction and the City's adopted building codes pursuant to City Municipal Code Title 15, *Buildings and Construction*.

Pursuant to California Code of Regulations (CCR), Title 24, Part 2, the CBC establishes minimum standards for building design in the State, and it is consistent with or more stringent than Uniform Building Code requirements. Local codes are permitted to be more restrictive than Title 24, but are

[25] *Section 5.08 Geology and Soils, City of Upland General Plan Final Program Environmental Impact Report,* Exhibit 5.8-1, Alquist-Priolo Earthquake Fault Zones Map, City of Upland, September 2015.

[26] *Geotechnical and Infiltration Evaluation for Proposed Single-Family Residential Development, Assessor's Parcel Numbers (APNs) 1045-121-02 & 1045-151-34, Upland Colonies 59, North of East 15th Street, Upland, San Bernardino County, California.* Page 5. GeoTek, Inc. July 2018 (Appendix D).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

required to be no less restrictive. The CBC is designed and implemented to improve building safety, sustainability, and consistency, and to integrate new technology and construction methods to construction Projects throughout California.

Chapter 16 of the CBC regards General Design Requirements, including regulations governing seismically resistant construction (Chapter 16, Division IV) and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 18 and Appendix Chapter 33 regard Site demolition, excavations, foundations, retaining walls, and grading, including requirements for seismically resistant design, foundation investigations, stable cut and fill slopes, and drainage and erosion control. The procedures and limitations for the design of structures are based on-site characteristics, occupancy type, configuration, structural system height, and seismic zoning. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in California Occupational Safety and Health Administration regulations (CCR, Title 8).

Title 15, *Buildings and Construction,* of the City Municipal Code incorporates, by reference, the design and construction standards of the most current edition of the CBC. State law requires the design and construction of new structures comply with current CBC requirements which address general geologic, seismic (including ground shaking), and soil constraints for new buildings. Accordingly, the Project-specific Geotechnical and Infiltration Evaluation details proper engineering design and construction recommendations to be implemented through development of the Proposed Project as **Standard Condition G-1** in conformance with the most current edition of the CBC and Title 15, *Buildings and Construction,* of the City Municipal Code. Implementation of **Standard Condition G-1** would ensure that impacts related to strong seismic ground shaking would be less than significant. No mitigation is required.

**Standard Conditions:** No mitigation is required; however, the following Standard Condition is a regulatory requirement implemented as a routine action conditioned by the City that would ensure impacts related to seismic activity remain less than significant.

**Standard Condition G-1:** Prior to the approval of grading and/or building permits, the Applicant shall provide evidence to the City for review and approval that on-site structures, features, and facilities have been designed and will be constructed in conformance with applicable provisions of the most current edition of the CBC at the time of construction and the recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation. Geotechnical recommendations include, but are not limited to, remedial earthwork and/or ground improvement to provide a sufficient layer of engineered fill or densified soil beneath the structural footings/foundations, as well as proper surface drainage devices and erosion control. Verification testing must be performed upon completion of ground improvements to confirm that the compressible soils have been sufficiently densified. This condition shall be implemented to the satisfaction of the City Building and Safety Division.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Prior to the issuance of grading permits, the Applicant would be required to prepare and submit detailed grading plans pursuant to Section 15.52 , *Grading Restrictions*, of the City Municipal Code. These plans would be prepared in conformance with applicable standards of the City for compliance with the most current edition of the CBC at the time of construction, pursuant to Title 15, *Buildings and Construction,* of the City Municipal Code and as modified by the City (Standard Condition G-1). Proper engineering design and construction in conformance with the most current edition of the CBC at the time of construction and Project-specific geotechnical recommendations (**Standard Condition G-1**) would ensure potential impacts from strong seismic ground shaking would be **less than significant.** No mitigation is required.

(iii) No portion of the City has been evaluated for potential seismic-related ground failure (liquefaction and earthquake-induced landslides).[27] Liquefaction occurs primarily in saturated, loose, fine-to-medium-grained alluvial soils in areas where the groundwater table is within 50 feet of the surface. Shaking suddenly causes soils to lose strength and behave as a liquid. Liquefaction-related effects include loss of bearing strength, lateral spreading, and flow failures or slumping.

The Site is not located within a designated liquefaction hazard zone. The depth to groundwater is greater than 100 feet below existing grade. Therefore, liquefaction is not considered to be a hazard at the subject Site due to the great depth to groundwater (greater than 50 feet) and the current geologic hazard mapping.

Prior to the issuance of grading permits, the Applicant would be required to prepare and submit detailed grading plans as specific improvements and developments are proposed pursuant to Section 15.52, *Grading Restrictions*, of the City Municipal Code. These plans would be prepared in conformance with applicable standards of the City for compliance with the most current edition of the CBC at the time of construction. Implementation of Standard Condition G-1 (compliance with the current edition of the CBC and recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation) would ensure development proposed as part of the Project would be protected from seismic-related ground failure, including liquefaction. Impacts would be **less than significant** and no mitigation is required.

(iv) Due to the relatively flat topography of the Project area and the absence of adjacent hillside areas, the risk of landslides is considered negligible for design purposes. The 3:1 slopes proposed within the modified basin have been evaluated and were determined to be "grossly stable and geotechnical suitable."[28] All proposed retaining walls would be designed and constructed in accordance with the Retaining and Garden Wall Design and Construction criteria specified in the Section 5 of the Project-specific Geotechnical and Infiltration Evaluation pursuant to **Standard Condition G-1**. Detailed grading plans would be reviewed and approved by the City pursuant to Section 15.52, *Grading Restrictions*, of the City Municipal Code to ensure appropriate design features are implemented. Impacts would be **less than significant** and no mitigation is required.

[27] *Section 5.8 Geology and Soils, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.8-2, City of Upland, September 2015.

[28] Slope Stability Evaluation – New Basin, Tentative Tract 20245, Upland, San Bernardino County, California, GeoTek, Inc., September 16, 2019.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| (b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* On-Site soils include Soboba stony loamy sand (SpC), 2 to 9 percent slopes, which is excessively drained and has a low runoff class.[29] Furthermore, the City's General Plan EIR identifies this type of soil as exhibiting only slight erosional tendencies.[30] Construction activities have the potential to expose bare soil to wind and/or water which could result in soil erosion or loss of topsoil. In order to address the potential for erosion, the Project is required to implement Best Management Practices (BMPs) during the construction phase that would reduce erosion in accordance with National Pollutant Discharge Elimination System (NPDES) regulations. These BMPs would be selected as part of the Storm Water Pollution Prevention Plan (SWPPP) that is required to address erosion and discharge impacts associated with the proposed on-site grading.

The Project must also comply with the City's grading permit requirements, pursuant to City Municipal Code Chapter 15.52, *Grading Restrictions,* which would ensure that construction practices include measures to protect exposed soils such as covering stockpiled soils and use of straw bales and silt fences to minimize off-site sedimentation. In addition, ultimate buildout of the Project Site would cover its surface with asphalt, concrete, and landscaping materials. Pursuant to **Standard Condition G-1,** the Project-specific Geotechnical and Infiltration Evaluation includes post-construction considerations that include provisions for landscape maintenance and planting in order to control surface drainage and runoff and maintain a suitable vegetation cover to minimize erosion. Compliance with state and federal requirements, as well as with City grading permit requirements and **Standard Condition G-1**, would ensure that the Proposed Project would have a **less than significant impact** related to soil erosion or loss of topsoil. No mitigation is required.

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| (c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* No portion of the City has been evaluated for potential seismic-related ground failure (liquefaction and earthquake-induced landslides).[31] Liquefaction occurs primarily in saturated, loose, fine-to-medium-grained alluvial soils in areas where the groundwater table is within 50 feet of the surface. Shaking suddenly causes soils to lose strength and behave as a liquid. Liquefaction-related effects include loss of bearing strength, lateral spreading, and flow failures or slumping.

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once

[29] *Web Soil Survey, United States Department of Agriculture, Natural Resources Conservation Service*. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx (accessed October 1, 2018).

[30] *Section 5.08 Geology and Soils, City of Upland General Plan Final Program Environmental Impact Report,* Table 5.8-1, Exhibit 5.8-3, City of Upland, September 2015.

[31] *Section 5.8 Geology and Soils, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.8-2, City of Upland, September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

liquefaction transforms the subsurface layer into a fluid mass, gravity plus the seismic inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements, and such movement typically damages pipelines, utilities, bridges, and structures.

Factors that contribute to slope failure and landslides include slope height and steepness, shear strength and orientation of weak layers in the underlying geologic units, and pore water pressures.

Ground subsidence is typically a gradual settling or sinking of the ground surface with little or no horizontal movement, although fissures (cracks and separations) can result from lowering of the ground surface. Most of the damage caused by subsidence is the result of oil, gas, or groundwater extraction from below the ground surface. Ground subsidence may occur as a response to natural forces such as earthquake movements, which can cause abrupt elevation changes of several feet or densification of low density granular soils during an earthquake event that may cause several inches of settlement.

Hydrocompaction, or soil collapse, typically occurs in recently deposited Holocene (less than 11,000 years before present time) soils that were deposited in an arid or semi-arid environment. Soils prone to collapse are commonly associated with man-made fill, wind-laid sands and silts, and alluvial fan and mudflow sediments deposited during flash floods. Sudden substantial settlement may occur when saturated, collapsible soils lose their cohesion. An increase in surface water infiltration (such as from irrigation) or a rise in the groundwater table, combined with the weight of a building or structure, may initiate settlement, causing foundations and walls to crack.

According to the 2008 Western Municipal Water District Cooperative Well Measuring Program, the groundwater depth within the City generally ranges from approximately 80 feet to 400 feet below ground surface.[32] The Site is not located within a designated liquefaction hazard zone. Accordingly, the potential for seismic-induced liquefaction and lateral spreading at the Project Site is low. Additionally, the relatively flat topography of the Project area and the absence of adjacent hillside areas reduce the risk of landslides to negligible. All proposed retaining walls would be designed and constructed in accordance with the Retaining and Garden Wall Design and Construction criteria specified in the Section 5 of the Project-specific Geotechnical and Infiltration Evaluation pursuant to **Standard Condition G-1**. There are no known landslides at the Site, nor is the Site in the path of any known or potential landslides. Proposed Project operations do not include oil, gas, or groundwater extraction, which could result in ground subsidence, and on-site soils (i.e., Soboba stony loamy sand (SpC)) are excessively drained and have a low runoff class with little water-retention capacity.)[33] Therefore, the potential for hydrocompaction, or soil collapse, is considered low.

The existing on-site slopes appear to be inclined at ratios of about 3:1 (horizontal:vertical). Although the proposed grades for the Site have not been provided, the existing basin is expected to be filled so that the proposed residential unit buildings will be close to adjacent development Site grades.

[32] *Ibid.* page 5.8-12.

[33] *Web Soil Survey, United States Department of Agriculture, Natural Resources Conservation Service*. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx (accessed October 1, 2018).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Therefore, cuts and fills up to about 15 feet in thickness are expected. Site balance areas would be available during grading operations in order to adjust Project grades, depending on actual field conditions at the conclusion of earthwork construction, and subsidence on the order of 0.1 to 0.2 feet may occur. The 3:1 slopes proposed within the modified basin have been evaluated and were determined to be "grossly stable and geotechnical suitable."[34]

In order to ensure construction and operation of the Proposed Project would not significantly affect life or property from a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, the Applicant would be required to prepare and submit detailed grading plans as specific improvements and developments are proposed prior to the issuance of grading permits pursuant to Chapter 15.52, *Grading Restrictions*, of the City Municipal Code. These plans would be prepared in conformance with applicable standards of the City for compliance with the most current edition of the CBC at the time of construction. Furthermore, implementation of **Standard Condition G-1** (compliance with the current edition of the CBC and recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation) would ensure an adequate layer of engineered fill would be appropriately compacted beneath all structural foundations to protect against the potential for ground subsidence.

Through compliance with the CBC, City Municipal Code, and **Standard Condition G-1**, development proposed as part of the Project would be protected from unstable geologic units or soil that could result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. Impacts would be **less than significant** and no mitigation is required.

| | | | | |
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| (d) Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Expansive soils generally have a significant amount of clay particles that can give up water (shrink) or take on water (swell). The change in volume exerts stress on buildings and other loads placed on these soils. The extent of shrink/swell is influenced by the amount and kind of clay in the soil. The occurrence of these soils is often associated with geologic units having marginal stability. As stated previously, on-site soils (i.e., Soboba stony loamy sand (SpC)) are excessively drained and have a low runoff class with little water-retention capacity.[35] On-Site soils possess a "very low" expansion potential. Therefore, these soils have a low potential for expansion when wetted.

Typically, measures to protect life and property from potentially expansive soils include over-excavating on-site native and non-native soils, and replacing them with properly compacted fill. The Applicant would be required to prepare and submit detailed grading plans as specific improvements and developments are proposed prior to the issuance of grading permits pursuant to Section 17.50.040, *Application Submittal and Review*, of the City Municipal Code. These plans would be prepared in conformance with applicable standards of the City for compliance with the most current edition of the CBC at the time of

[34] Slope Stability Evaluation – New Basin, Tentative Tract 20245, Upland, San Bernardino County, California, GeoTek, Inc., September 16, 2019.
[35] *Ibid.*

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| construction. Implementation of **Standard Condition G-1** (compliance with the current edition of the CBC and recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation) would ensure development proposed as part of the Project would be protected from expansive soil. Impacts would be **less than significant** and no mitigation is required. | | | | |
| (e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☐ | ☒ |
| *No Impact.* The Proposed Project will connect to an existing sewer system; therefore, the Project would not require the construction or expansion of septic tanks or wastewater treatment facilities. **No impact** would occur and no mitigation is required. | | | | |
| f) Directly or indirectly destroy a unique paleontological resource or Site or unique geologic feature? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated.* The City of Upland lies upon a relatively shallow stratum of Holocene alluvium, under which [older] late Pleistocene sediments are buried. The City's General Plan EIR states the City in general has a low paleontological potential for Holocene Epoch (less than 10,000 years old) sediments and a moderate paleontological potential for late Pleistocene Epoch (10,000 years to 120,000 years old) sediments.[36] Under these conditions, it is unlikely that shallow excavation would uncover any fossiliferous materials; however, excavation reaching depths of 15 feet or more may expose paleontological resources.[37] Adherence to **Mitigation Measure GEO-1** would reduce the potential impact on unknown paleontological resources to a **less than significant** level.<br><br>**GEO-1** Prior to the issuance of grading permits, the maximum depth of ground-disturbing activities shall be provided to the City. If ground disturbance in excess of 15 feet is required, the Applicant shall provide evidence to the City that a qualified paleontologist has been retained. Upon review of Project materials, the qualified paleontologist shall identify those areas of the Site that require monitoring.<br><br>In the event that paleontological resources are unearthed during ground-disturbing activities, the qualified paleontologist shall halt or redirect ground-disturbing activities away from the vicinity of the find so that the find can be evaluated. A buffer area shall be established around the find within which construction activities shall not be allowed to continue. The buffer area parameters will be determined by the Project paleontologist in consultation with the City and Project proponent, but shall not be less than 100 feet. Work shall be allowed to continue outside the buffer area. The paleontologist shall determine the need for paleontological construction monitoring in the vicinity of the find thereafter. | | | | |

[36] *Section 5.09 Cultural Resources, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.9-16, City of Upland, September 2015.

[37] *Ibid.* Page 5.9-18.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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All paleontological resources unearthed by Project construction activities shall be evaluated by a qualified paleontologist. At the paleontologist's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock samples for initial processing and evaluation of the find. The Project proponent shall coordinate with the paleontologist and the City to develop an appropriate treatment plan for the resources. Preservation in place (i.e., avoidance) shall be considered the preferred treatment measure. If preservation in place is not feasible, treatment may include the implementation of paleontological data recovery/salvage excavations to remove the resource from the Project Site along with subsequent laboratory processing and analysis of the fossil specimens.

Any fossils encountered and recovered shall be prepared to the point of identification and catalogued before they are donated for final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, and photographs shall also be filed at the repository and/or school.

Following the completion of the above measures, the paleontologist shall prepare a report summarizing the results of the monitoring and salvaging efforts, the methodology used in these efforts, as well as a description of the fossils collected and their significance. The report shall be submitted by the Project proponent to the City, the San Bernardino County Museum, the Natural History Museum of Los Angeles County, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the Project and required mitigation measures. This measure shall be implemented to the satisfaction of the City Planning Division.

With implementation of **Mitigation Measure GEO-1**, potential impacts to paleontological resources would be reduced to a **less than significant** level.

### 3.3.8 Greenhouse Gas Emissions

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact. State CEQA Guidelines* Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Currently, there is no statewide greenhouse gas (GHG) emissions threshold used to determine potential GHG emissions impacts of a project. Air districts in the state are still developing and revising threshold methodology and thresholds. To provide guidance to local lead agencies on determining significance for

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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GHG emissions in their CEQA documents, the SCAQMD convened a GHG CEQA Significance Threshold Working Group (Working Group). Based on the last Working Group meeting (Meeting No. 15) held in September 2010, the SCAQMD is proposing to adopt a tiered approach for evaluating GHG emissions for development projects where the SCAQMD is not the lead agency. This concept is equivalent to the existing consistency determination requirements in *CEQA Guidelines* Sections 15064(h)(3), 15125(d), or 15152(a). The SCAQMD has continued to consider adoption of significance thresholds for residential and general development projects. The most recent proposal issued in September 2010 uses the tiered approach to evaluate potential GHG impacts from various uses. For purposes of this analysis, the SCAQMD Tier 3 Option 2 approach of a single numerical screening threshold of 3,000 metric tons (MT) of carbon dioxide-equivalent gases ($CO_2e$) per year for all non-industrial projects is utilized in order to determine the significance for the Proposed Project's GHG emissions.

Construction and operation of the Proposed Project would generate greenhouse gas emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during the Project's operation (as opposed to during its construction). A Site-specific Greenhouse Gas Analysis (Appendix E) was prepared to calculate GHG emissions during construction and operation of the Proposed Project. These calculations are based on compliance with all mandates imposed by the State of California and the SCAQMD aimed at the reduction of GHG emissions. In particular, the Pavley Standards, Low Carbon Fuel Standards, and Renewable Portfolio Standards (RPS) will be in effect for the Senate Bill (SB) 32 target year of 2020, and therefore are accounted for in the Project's emission calculations.

**Construction Emissions:** The Project would result in short-term emissions of GHGs during construction. GHGs would be emitted through the operation of construction equipment and from worker and vendor vehicles, which typically use fossil-based fuels for operation. The combustion of fossil-based fuels creates GHGs such as carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). Furthermore, $CH_4$ is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. The SCAQMD recommends calculating the total greenhouse gas emissions for the construction activities, dividing it by a 30-year project life, and then adding that number to the annual operational phase GHG emissions. The annual construction-related GHG emissions amortized over 30 years is 25.63 MT of $CO_2e$ gases.

**Operation Emissions:** Long-term operation of the Proposed Project would generate GHG emissions from various source categories. Area-source emissions would be associated with activities including landscaping and maintenance of the Project Site. Energy-source emissions would occur at off-site utility providers as a result of demand for electricity and natural gas by the Proposed Project. Mobile-source emissions of GHGs would include Project-generated vehicle trips associated with residential occupancy of the Site, as detailed in the Project-specific Traffic Impact Analysis (TIA) (Appendix I) and in Section 3.3.17 of this Initial Study. Waste generated by the Project and water

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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used also would result in GHG emissions.

Table 3.3.8A lists the estimated GHG emissions associated with operation of the Project and includes the estimated construction emissions of GHGs amortized over 30 years.

As detailed in Table 3.3.8A, the Project would result in GHG emissions of 1,415.62 MT $CO_2e$ per year. This emission level is less than the SCAQMD Tier 3 Option 2 GHG threshold of 3,000 MT $CO_2e$ per year for all non-industrial Projects. Therefore, the Proposed Project will not generate greenhouse gas emissions that would have a significant impact on the environment. Impacts will be **less than significant** and no mitigation is required.

**Table 3.3.8A: Total Project Greenhouse Gas Emissions (Annual)**

| Source | Pollutant Emissions, MT/year | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
| **Construction emissions amortized over 30 years** | 25.50 | 0.01 | 0.00 | 25.63 |
| **Operational Emissions** | - | - | - | - |
| Area Sources | 16.96 | 0.00139 | 0.00029 | 17.08 |
| Energy Sources | 291.06 | 0.00963 | 0.00354 | 292.36 |
| Mobile Sources | 1,006.83 | 0.05 | 0.00 | 1008.19 |
| Waste Sources | 15.73 | 0.93 | 0.00 | 38.97 |
| Water Usage | 28.80 | 0.14 | 0.00354 | 33.39 |
| **Total $CO_2e$ (All Sources)** | **1,415.62** | | | |
| **SCAQMD Threshold ($CO_2e$)** | **3,000** | | | |
| **Significant?** | **No** | | | |

Source: Table 3-1: *Upland Colonies Greenhouse Gas Analysis, City of Upland.* Urban Crossroads. August 2018. (Appendix E).

Note: Numbers in table may not appear to add up correctly due to rounding.

$CH_4$ = methane
$CO_2$ = carbon dioxide
$CO_2e$ = carbon dioxide equivalent
MT/yr = metric tons per year
$N_2O$ = nitrous oxide
SCAQMD = South Coast Air Quality Management District

| | | | | |
|---|---|---|---|---|
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* SB 32 requires the California Air Resources Board (CARB) to reduce statewide GHG emissions to 1990 level by 2020. As part of this legislation, CARB was required to prepare a "Scoping Plan" that demonstrates how the State will achieve this goal. The Scoping Plan was adopted in 2011, and in it, local governments were described as "essential partners" in meeting the statewide goal, recommending a GHG reduction level 15 percent below 2005–2008 levels, depending on when a full emissions inventory is available, by 2020.

CARB released the 2017 Scoping Plan Update November of 2017. The 2017 Scoping Plan Update provides strategies for achieving the 2030 target established by Executive Order B-30-15 and

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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codified in SB 32 (40 percent below 1990 levels by 2030). Applicable reduction strategies are presented in Table 3.3.8B.

**Table 3.3.8B: Project Consistency with CARB Scoping Plan Greenhouse Gas Emission Reduction**

| Scoping Plan Measure | Measure Number | Consistency Analysis |
|---|---|---|
| Pavley Motor Vehicle Standards (AB 1493) | T-1 | **Consistent:** Residents would purchase and operate vehicles in compliance with incumbent CARB vehicle standards, as required by law. |
| Limit High Global-Warming-Potential Use in Consumer Products | H-4 | **Consistent:** Residents would purchase and operate consumer products that would comply with incumbent regulations, as required by law. |
| Motor Vehicle Air Conditioning Systems - Reduction from Non-Professional Servicing | H-1 | **Consistent:** Residents would be prohibited from performing air conditioning repairs and required to use professional servicing. |
| Tire Pressure Program | T-4 | **Consistent:** Motor vehicles driven by residents would maintain proper tire pressure when vehicles are serviced, as required by law. |
| Low Carbon Fuel Standard | T-2 | **Consistent:** Motor vehicles driven by residents would use fuels that are compliant with incumbent standards, as required by law. |
| Water Use Efficiency | W-1 | **Consistent:** The Project will be required to incorporate water-reducing or water-saving toilets, showerheads, and irrigation systems, as well as drought-tolerant landscaping. |
| Green Buildings | GB-1 | **Consistent:** As required, Project facilities would be constructed in compliance with Title 24 of the California Code of Regulations (The Energy Efficiency Standards for Residential and Nonresidential Buildings). |
| Air Conditioning Refrigerant Leak Test During Vehicle Smog Check | H-5 | **Consistent:** Motor vehicles driven by residents would comply with leak test requirements during smog checks, as required by law. |
| Energy Efficiency Measures (Electricity) | E-1 | **Consistent:** As required in accordance with Title 24 of the California Code of Regulations (The Energy Efficiency Standards for Residential and Nonresidential Buildings)**,** the Project would incorporate green building construction practices and utilization of energy-efficient appliances. |
| Energy Efficiency (Natural Gas) | CR-1 | **Consistent:** As required in accordance with Title 24 of the California Code of Regulations (The Energy Efficiency Standards for Residential and Nonresidential Buildings), the Project would incorporate green building construction practices and utilization of energy-efficient appliances. |
| Greening New Residential and Commercial Construction | GB-1 | **Consistent:** As required, Project facilities would be constructed in compliance with Title 24 of the California Code of Regulations (The Energy Efficiency Standards for Residential and Nonresidential Buildings). |

Source: Table 3-2: *Upland Colonies Greenhouse Gas Analysis, City of Upland.* Urban Crossroads. August 2018. (Appendix E).

The 2017 Scoping Plan Update recommends local plan level GHG emissions reduction goals and builds on the 2008 Scoping Plan in order to achieve the 40 percent reduction from 1990 levels by 2030. CARB recommends that local governments aim to achieve a communitywide goal to achieve emissions of no more than 6 metric tons $CO_2e$ per capita by 2030 and no more than 2 metric tons $CO_2e$ per capita by 2050. CARB identified reduction measures to achieve this goal as set forth in the CARB Scoping Plan.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Therefore, Projects that are consistent with the CARB Scoping Plan are also consistent with the communitywide goal for GHG emissions reduction. As summarized in Table 3.3.8B, the Proposed Project is consistent with applicable CARB Scoping Plan GHG emissions reduction measures. Additionally, the Project would not actively interfere with any future County-mandated, State-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development countywide, statewide, or nationwide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order B-30-15 or SB 32 because it does not interfere with the state's implementation of GHG reduction plans described in the CARB's Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758.

In September 2015, the City adopted the Upland Climate Action Plan (CAP), under which the City selected a goal to reduce its community GHG emissions by at least 16 percent from 2008 levels by the year 2020.[38] The City's CAP details the following five strategies to accomplish its GHG reduction goal:

1. Transportation and Land Use Strategy: Promote a balanced transportation system that promotes the use of public transportation and bicycles, reduces congestion, and helps encourage residents to engage in healthy and active lifestyles.
2. Energy Use and Conservation Strategy: Reduce energy consumption throughout all sources within the City, and incorporate clean, renewable energy sources.
3. Water Use and Efficiency Strategy: Conserve and protect water resources and promote efficiency.
4. Solid Waste Reduction and Recycling Strategy: Manage solid waste generation and diversion.
5. Municipal Strategy: Reductions that the City can implement to reduce municipal emissions.

Step 1 in determining whether a Project is consistent with the City's CAP is determining if the Project is consistent with the City's General Plan growth projections, which are the basis of the City's GHG emissions inventory (this includes consistency with the planned land use, zoning, and development intensity of a particular Site). If a Project is consistent with the City's General Plan growth projections, it is reasonable to conclude that Project's GHG emissions have been accounted for in the CAP. However, the Proposed Project includes a General Plan Amendment (GPA) from Public Utilities--Flood Control/Recharge (PU-FC/R) to Villa Serena Specific Plan (SP). The City's General Plan and the CAP assumed the current PU-FC/R land use designation in its GHG emission estimates. The emissions associated with the proposed SFR-M development were not included in the City's land use projections; therefore, the CAP also does not anticipate emissions from the Proposed Project's land uses.

If the discretionary Project is not consistent with the Upland General Plan's year 2035 growth projections, the Project is not necessarily inconsistent with the CAP. The CAP includes General Plan

[38] City of Upland Climate Action Plan. City of Upland. September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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growth assumptions and depicts the opportunity areas where the General Plan would focus growth. The following steps must be performed to determine consistency:

**Step 2:** Consider the extent to which the Project supports or includes applicable strategies and measures, or advances the actions identified in the CAP.

**Step 3:** Consider the consistency of the Project with the emission reduction targets set by the CAP.

**Step 4:** Consider the extent to which the Project would not interfere with the implementation of CAP strategies, objectives, measures, or actions.

A Project that can justify its consistency with any of these steps can be deemed consistent with the CAP by the decision-making body. In accordance with Step 2 and Step 4, the Proposed Project would incorporate design features to comply with the CAP's five strategies established to attain its GHG reduction goal.

In accordance with the CAP's Objective B: Maximize Land Use Efficiency, the Project is consistent with transportation and land use Measure T-7: Residential Density. The Proposed Project would increase residential density on the flood control basin, which would help the City to increase residential land use density goals in the CAP. Furthermore, The City's 2012 jobs-to-housing ratio is well above the San Bernardino County job/housing ratio but slightly lower than the SCAG regional job/housing ratio; therefore, the City may be considered "jobs balanced" relative to the greater SCAG region. By 2040, however, the City's jobs-to-housing is expected to exceed both the County's and SCAG's jobs-to-housing ratios, as detailed in Table 3.3.13A, meaning the City would be relatively "jobs rich" and "housing poor," and additional housing within the City would be required to balance the jobs-to-housing ratio at the local level. By developing housing, the Project would support the balance of jobs to housing in the City so that residents would not have to travel far to work. Therefore, a balanced jobs-to-housing ratio generally fulfills several key issues and policies of the City's CAP through the reduction in regional vehicle miles traveled in order to reduce GHG emissions.

In accordance with the CAP's Energy Use and Conservation Strategy, the Project would incorporate energy efficiency measures for all Project buildings such as increased insulation and installation of energy-efficient lighting, heating and cooling systems, appliances, equipment, and control systems pursuant to Title 24 of the California Code of Regulations (The Energy Efficiency Standards for Residential and Nonresidential Buildings).

In accordance with the CAP's Water Use and Efficiency Strategy, the Project would comply with the City's water reduction requirements pursuant to City Municipal Code Section 13.16.050, *Conservation program-High shortage stage,* through installation of water-reducing or water-saving toilets, showerheads, and irrigation systems, as well as drought-tolerant landscaping.

Finally, in accordance with the CAP's Solid Waste Reduction and Recycling Strategy, construction of the Project would result in recycling at least 60 percent of all construction materials and utilization of "green building materials" for at least 10 percent of the Project in accordance with the California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Program.

Compliance with the CARB Scoping Plan and the City's CAP's GHG emissions reduction strategies would foster, among other benefits, reductions in vehicle miles traveled, energy and water consumption, waste generation, and associated GHG emissions. Accordingly, the Proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions. Impacts would be **less than significant** and no mitigation is required.

### 3.3.9 Hazards and Hazardous Materials

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Potential hazardous materials such as fuel, paint products, lubricants, solvents, and cleaning products may be used and/or stored on Site during construction of the Proposed Project. These materials are typical of materials delivered to construction sites. Due to the relatively small scale of anticipated Site improvements (i.e., development of 65 single-family residential units and relocation of a flood control basin adjacent to the east of the Project Site), only limited quantities of these materials are expected to be used during construction, so they are not considered hazardous to the public at large.

The transport, use, and storage of hazardous materials during construction will be regulated by the San Bernardino County Fire District, the California Occupational Safety and Health Administration, and the United States Department of Transportation (USDOT), which regulates the transport of hazardous materials and waste in connection with construction of the Project and would require carriers to register with the Department of Toxic Substances Control (DTSC). The USDOT Office of Hazardous Materials Safety prescribes strict regulations for the safe transportation of hazardous materials by truck and rail on State highways and rail lines, as described in Title 49 of the *Code of Federal Regulations*, and implemented by Title 13 of the CCR.

Occupation of the proposed residential uses is expected to utilize relatively small amounts of hazardous materials, such as chemicals associated with fuel for landscape maintenance equipment, solvents, cleaning products, pesticides/fertilizers, and other similar chemicals. These materials are substantially similar to household chemicals and solvents already in general and wide use throughout the City and in the vicinity of the Project Site.

Compliance with all applicable federal, state, and local laws would ensure potential impacts related to the routine transport, use, or disposal of hazardous materials are **less than significant.** No mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment? | ☐ | ☐ | ☒ | ☐ |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

*Less Than Significant Impact.* A Project-specific Phase I Environmental Site Assessment (ESA) was prepared for the purposes of identifying recognized environmental condition or historical recognized environmental conditions on the subject property (Appendix F). "Recognized environmental condition" is interpreted as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The term is not intended to include de minimis conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis are not recognized environmental conditions. "Historical Recognized environmental condition" means an environmental condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. If a past release of any hazardous substances or petroleum products has occurred in connection with the property, with such remediation accepted by the responsible regulatory agency (for example, as evidenced by the issuance of a no further action letter or equivalent), this condition shall be considered a historical recognized environmental condition.

The Project Site and up to a one-mile radius encompassing the Project Site were evaluated via the State Water Resources Control Board (SWRCB) GeoTracker database,[39] the DTSCs EnviroStor database,[40] and the Hazardous Waste and Substances Sites (Cortese) List.[41] Additional database review of federal and state environmental records was conducted in accordance with the American Society of Testing and Materials (ASTM) E 1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.*

According to the Phase I ESA, no evidence or indication of RECs, or conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the Site has been identified. An on-site reconnaissance confirmed the Project Site serves as a flood control and groundwater recharge basin. Visual evidence of hazardous substances or wastes was not observed during the Site reconnaissance, and no pungent or acrid odors were observed emanating from the Site. Based on readily available historic information, the Site appears to be vacant land from before 1938 to at least 1966. The existing basin can be observed beginning in 1975. The surrounding properties appear to have been historically vacant land or generally utilized for residential development. The residences to the south of East 15th Street can be observed in 1959.

The Project Site appears on the Phase I ESA database report obtained for this assessment. The Site is listed with the SWRCB California Integrated Water Quality System (CIWQS) database as Inland Empire Utilities Agency (IEUA) Groundwater Recharge Basin Operations and Maintenance. This listing tracks

[39] *GeoTracker Database.* State Water Resources Control Board. https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=upland+memorial+park (accessed June 14, 2018).

[40] *EnviroStor Database.* California Department of Toxic Substances Control. https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=upland+memorial+park (accessed June 14, 2018).

[41] *Hazardous Waste and Substances Site List (Cortese).* California Department of Toxic Substances Control. https://www.envirostor.dtsc.ca.gov/public/search?cmd=search&reporttype=CORTESE&Site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM,COLUR&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST+(CORTESE) (accessed June 14, 2018).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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information regarding places of environmental interest, manages permits and other orders, tracks inspections, and manages violations and enforcement activities. The place/project type is listed as "dredge/fill site." No records of violations were reported for this listing. No other pertinent information is provided. Based on the historic use of the Site and status of its listing, the Project Site does not represent a recognized environmental condition.

None of the adjacent properties appear on the Phase I ESA database report. Five facilities are listed on the database report within the various search distances specified by ASTM E 1527-13; however, none of these facilities represent an environmental condition that would be of concern to the Project Site due to their status listings, distances, and/or locations (hydro-geologically down-or cross-gradient).

Through compliance with all applicable federal, state, and local laws, including but not limited to Title 49 of the Code of Federal Regulations implemented by Title 13 of the CCR, hazards to the public and the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment would be **less than significant.** No mitigation is required.

| | | | | |
|---|---|---|---|---|
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* The City currently has no plans to develop any new schools within one-quarter mile of the Project Site. The nearest existing school in proximity to the Project Site is the Foothill Knolls STEM Academy of Innovation (elementary school), located at 1245 Veterans Court, approximately 0.5 mile (2,640 feet) south of the Project Site. Other schools in proximity to the Project Site are the Sierra Vista Elementary School (253 E 14th Street) and the Saint Mark's Episcopal School (330 E 16th Street), approximately 0.55 mile to the southwest and northwest, respectively. In the absence of existing or proposed schools exist within one-quarter mile of the Project Site, **no impact** would occur. No mitigation is required.

| | | | | |
|---|---|---|---|---|
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | ☒ |

*No Impact*. Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by the California Environmental Protection Agency Hazardous Materials Data Management Program. The DTSC compiles information from subsets of the following databases to make up the Cortese List:

1. The DTSC list of contaminated or potentially contaminated hazardous waste sites listed in the California Sites database, formerly known as ASPIS, is included;
2. The California State Water Resources Control Board listing of leaking underground storage tanks

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

is included; and

3. The California Integrated Waste Management Board list of sanitary landfills that have evidence of groundwater contamination or known migration of hazardous materials (formerly WB-LF, now AB 3750).

A review of the Hazardous Waste and Substances Sites (Cortese) List revealed no properties in Upland or neighboring Rancho Cucamonga are listed. The nearest property listed on the Cortese List is the GE Engine Services Test Cell Facility (GE Aircraft) located at 2264 E. Avion Place, Ontario, approximately 5.2 miles to the southeast and downgradient of the Project Site. Based on the distance and location (down gradient) of this facility, past operations at this property are unlikely to have adversely affected the Project Site.

According to the Phase I ESA, no evidence or indication of RECs, or conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the Site has been identified. The analysis provided in response to Checklist Questions 3.3.9a and b concludes none of the adjacent properties appear on the Phase I ESA database report. Additionally, none of the five facilities listed on the database report within the various search distances specified by ASTM E 1527-13 represent an environmental condition that would be of concern to the Project Site due to their status listings, distances, and/or locations (hydro-geologically down-or cross-gradient). Therefore, **no impact** related to the Cortese List or other governmental databases would occur. No mitigation is required.

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| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* The closest airport in proximity to the Project Site is Cable Airport, located approximately 2.6 miles to the west. As detailed in Map 3A of the Cable Airport Land Use Compatibility Plan (CALUCP), the Project Site is not within any of the Cable Airport Land Use Compatibility Zones.[42] Therefore, **no impact** would occur and no mitigation is required.

| | | | | |
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| f) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Fire protection and emergency medical response services are being provided by the San Bernardino County Fire District (SBCFD). The nearest fire station to the Project Site is San Bernardino County Fire Station 164 located at 1825 N Campus Avenue (approximately 1.0 mile northwest of the Project Site). The next nearest fire station to the Project Site is San Bernardino County Fire Station 161 located at 475 North 2nd Avenue (approximately 1.6 miles southwest of the Project Site). The City maintains mutual aid agreements with surrounding cities (e.g., Rancho Cucamonga, Ontario, Montclair, and Claremont), which allow for the services of nearby fire

[42] *Map 3A, Compatibility Policy Map, Cable Airport Land Use Compatibility Plan.* City of Upland, 2014.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

departments to assist the City during major emergencies.

The Project would be designed and operated per applicable standards required by the City for new development with regard to public safety. Policy PFS-2.11 of the City's General Plan requires new development to be accessible to emergency vehicles and not impede the ability of service providers to provide adequate emergency response.[43] As detailed in the Site-specific Fire Master Plan, the Project Site includes a primary ingress/egress gate and a secondary access along the western end of the Project Site that will provide residential entry/exit and also facilitate entry/exit for emergency vehicles. All driveway entryways and curves will include adequate turn radii for residents and emergency response vehicles, and the Proposed Project will include a C10 fire alarm, a "Knox" key system at the perimeter gate, and an "Infrared Automatic Gate System" to ensure immediate fire department access to the Project Site in the event of an emergency in accordance with Policy PFS-2.11 (Emergency Vehicle Access) of the City's General Plan.

Additionally, General Plan Policies PFS-2.9 and PFS-2.10 require new development, including the Proposed Project, to incorporate adequate emergency water flow, fire-resistant design and materials, early warning systems and evacuation routes, and to identify and mitigate any fire hazards during the development review process.[44] Fire hydrants will be incorporated approximately 250 feet apart along the entire length of the Project Site, and the Proposed Project design will be submitted to the SBCFD for review and approval prior the issuance of building permits. Furthermore, the Project would be required to pay Development Impact Fees (DIFs) used to fund capital costs associated with constructing new public safety structures and purchasing equipment for new public safety structures. Adherence to the emergency access measures required by the City would ensure a **less than significant impact** related to implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan. No mitigation is required.

| | | | | |
|---|---|---|---|---|
| g) Expose people or structures, directly or indirectly to a significant risk of loss, injury, or death involving wildland fires? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* Exhibit 5.14-1 of the Hazards and Hazardous Materials Element in City's General Plan EIR identifies the Project Site to be outside any fire hazard zone.[45] The Project Site is adjacent to a groomed golf course and residential uses. The Project Site is not located near a wildland area. Due to the existing and surrounding urban development, **no impact** related to this issue would occur. No mitigation is required.

[43] *Chapter 7 Public Facilities and Services Element, City of Upland General Plan*, Page PFS-3, City of Upland, September 2015.
[44] *Ibid.*
[45] *Section 5.14 Hazards and Hazardous Materials, City of Upland Final Program Environmental Impact Report.* Exhibit 5.14-1. City of Upland, September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.10 Hydrology and Water Quality**<br>Would the Project: | | | | |
| a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* The City is a co-permittee under Santa Ana Regional Water Quality Control Board Order number R8-2010-0036, NPDES Permit No. CAS618036, also known as the Municipal Separate Storm Sewer System or MS4 permit. The San Bernardino County Water Quality Management Plan was developed to implement compliance with the MS4 permit. Construction of the proposed 65 single-family residential units and associated infrastructure improvements such as reconfiguration of the flood control basin (15$^{th}$ Street Basin) will require ground-disturbing activities that could result in eroded soils and other pollutants entering the storm drain system. Pollutants, such as sediment, nutrients, heavy metals, toxic organics, trash and debris, and contaminants, may be conveyed by storm runoff from impermeable surfaces (e.g., streets, parking lots, athletic courts). The City implements National Pollutant Discharge Elimination System (NPDES) requirements for surface water discharge for all qualifying activities, including all development projects.

The Project Site is in excess of one acre; therefore, it is required to obtain coverage under an NPDES permit, which includes the submittal of a Notice of Intent (NOI) application to the State Water Resources Control Board (SWRCB), the receipt of a Waste Discharge Identification Number (WDIN) from the SWRCB, and the preparation of a Storm Water Pollution Prevention Plan (SWPPP) for construction discharges. An SWPPP is a written document that describes the construction operator's activities to comply with the requirements in the NPDES permit. The SWPPP is intended to facilitate a process whereby the operator evaluates potential pollutant sources at the Site and selects and implements Best Management Practices (BMPs) designed to prevent or control the discharge of pollutants in storm water runoff. During the construction period, the Project would use a series of BMPs to reduce erosion and sedimentation. These measures may include the use of gravel bags, silt fences, hay bales, check dams, hydroseed, and soil binders. The construction contractor would be required to operate and maintain these controls throughout the duration of construction activities. In addition, the construction contractor would be required to maintain an inspection log and have the log on-site to be reviewed by the City and representatives of the Santa Ana Regional Water Quality Control Board (RWQCB).

An NPDES permit would generally specify an acceptable level of a pollutant or pollutant parameter in a discharge (for example, a certain level of bacteria). The permittee may choose which technologies to use to achieve that level. Some permits, however, do contain certain generic BMPs. Table 3.3.10A lists BMPs for runoff control, sediment control, erosion control, and housekeeping that may be used during the construction of the Proposed Project.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

**Table 3.3.10A: General Best Management Practices**

| Runoff Control | Sediment Control | Erosion Control | Good Housekeeping |
|---|---|---|---|
| • Minimize clearing<br>• Preserve natural vegetation<br>• Stabilize drainage ways | • Install perimeter controls<br>• Install sediment trapping devices<br>• Inlet protection | • Stabilize exposed soils<br>• Protect steep slopes<br>• Complete construction in phases | • Create waste collection area<br>• Put lids on containers<br>• Clean up spills immediately |

Source: *National Menu of Stormwater Best Management Practices*. United States Environmental Protection Agency. https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu (accessed October 10, 2018). More detailed Best Management Practices are available at this web site.

The implementation of NPDES permits ensures that the State's mandatory standards for the maintenance of clean water and the federal minimums are met. Soil erosion and sedimentation impacts would be reduced to less than significant through implementation the BMPs detailed in an SWPPP and periodic inspections by RWQCB staff.

To ensure adherence and compliance with the NPDES permit, the following mitigation measures are required.

**HYD-1** Prior to the issuance of a grading permit, the Applicant shall file and obtain a Notice of Intent (NOI) with the Santa Ana Regional Water Quality Control Board (RWQCB) in order to be in compliance with the National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit for discharge of surface runoff associated with construction activities. Evidence that this NOI has been obtained (i.e., a copy of the Waste Discharger's Identification Number) shall be submitted to the City for coverage under the NPDES General Construction Permit. The NOI shall address the potential for an extended and discontinuous construction period based on funding availability. This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

**HYD-2** Prior to the issuance of a grading permit, the Applicant shall submit to and receive approval from the City of Upland of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire demolition, grading, and construction period. In addition, the SWPPP shall emphasize structural and nonstructural Best Management Practices (BMPs) to control sediment and non-visible discharges from the Site. The SWPPP will include inspection forms for routine monitoring of the Site during demolition and construction phase to ensure National Pollutant Discharge Elimination System (NPDES) compliance. The SWPPP will be kept on site for the duration of Project demolition and construction and will be available to the local RWQCB for inspection at any time. Project BMPs may include (but shall not be limited to) the following:

- Sediment discharges from the Site may be controlled by the following: sandbags, silt fences, straw wattles and temporary basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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inspected during construction and repairs will be made when necessary as required by the SWPPP.

- Materials that have the potential to contribute to non-visible pollutants to storm water must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.
- All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the Site. Stockpiles will be surrounded by silt fences and covered with plastic tarps.
- In addition, the construction contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sandbag barriers and other sediment control measures called for in the SWPPP. Monthly reports and inspection logs shall be maintained by the contractor and reviewed by the City of Upland and the representatives of the State Water Resources Control Board. In the event that it is not feasible to implement specific BMPs, the City of Upland can make a determination that other BMPs will provide equivalent or superior treatment either on or off site.

This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

All new development in the City is required to prepare a Water Quality Management Plan (WQMP) to reduce water pollution impacts from the operation of the developments. WQMPs include BMPs for source control, pollution prevention, Site design, low impact development (LID) implementation, and structural treatment control BMPs. On-site and off-site LID BMPs will treat storm water runoff from the Site at mitigated rates.

Under existing conditions, the Project Site is 100 percent pervious, and storm water drains through an on-site flood control basin from east to west where runoff enters a culvert that conveys storm water off-site through the municipal sewer system underneath 15$^{th}$ Street. The Proposed Project would convert approximately 55 percent of the Project Site into impervious surfaces, but it would maintain the existing drainage pattern generally from the east to west by directing flows along a reconfigured 84" reinforced concrete pipe (RCP) storm drain used to dewater the 15$^{th}$ Street Basin.

The existing RCP storm drain inlet is located approximately 200 feet northwest of the Fernando Avenue and 15$^{th}$ Street intersection. Upon Project buildout, on-site runoff from the Project Site will be collected and conveyed by a proposed on-site storm drain system to the relocated 15$^{th}$ Street Basin outlet located east of the Project Site, as detailed in the Project-specific Drainage Plan (Appendix G1) and described below.

The relocated 15$^{th}$ Street Basin will measure approximately 1,056 feet long by 120 feet wide with an approximate 21-foot depth below grade at the western end and a 7-foot depth below grade at the eastern end. The on-site runoff will be collected by grated inlets within each lot and two curb inlets and conveyed to a proposed 12-foot by 8-foot round catch basin (RCB) which will discharge into the

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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relocated 15th Street Basin. A section of the existing storm drain will be removed and replaced with a proposed 84" RCP storm drain along the southern boundary of the Project Site that will parallel the proposed 12-foot by 8-foot RCB storm drain. The relocated 84" RCP storm drain will be used to dewater the relocated 15th Street Basin. A proposed 30-inch RCP storm drain line will convey runoff from an existing 48-inch RCP storm drain and flows from Drainage Area A. This proposed 30-inch RCP storm drain line will be constructed 260 feet east of the western Project Site boundary. The 30-inch RCP storm drain will connect to the proposed 12-foot by 8-foot RCB storm drain. To satisfy San Bernardino County criteria and City Public Works Department comment, the Project has provided an emergency spillway alternative. The existing basin would be retrofitted to accommodate a trapezoidal emergency spillway with a crest at an elevation of 1,426.6 feet amsl. The emergency spillway, having a base of 16 feet and a top width of 48.4 feet, would be installed at the end of Grove Avenue. Combined with the proposed box weir outlet system, potential impacts associated with Project development would be minimized. The box weir outlet system would be designed to pass through the 200- to 500-year storm, with the emergency spillway providing discharge capacity for larger events. While the installation of the emergency spillway at the end of Grove Avenue is necessitated by San Bernardino County criteria, as the box weir outlet system can accommodate flows well in excess of the 100-year storm event, it is unlikely flows over the emergency spillway would occur during foreseeable storm events.

Storm water runoff conveyed through the relocated 84" RCP storm drain used to dewater the relocated 15th Street Basin would continue to flow downstream to Cucamonga Creek and discharge to Reach 3 of the Santa Ana River, through the Prado Basin Management Zone, and ultimately into the Pacific Ocean. Cucamonga Creek and Reach 3 list heavy metals as EPA-approved 303(D) listed impairments to water quality, which are the pollutants of concern of the Proposed Project.

To address potential water contaminants and other impairments (such as increased storm water volume from conversion of pervious surfaces to impervious surfaces) to downstream waters, the Proposed Project is required to comply with applicable federal, state, and local water quality regulations. Development of the Proposed Project would include three drainage areas (DA 1 though DA 3) to manage storm water runoff and direct it into appropriate LID BMPs. According to a preliminary Water Quality Management Plan (WQMP)[46] prepared for the Proposed Project (Appendix G2), DA 1 would manage runoff from 10,751 square feet of the Project Site, DA 2 would manage runoff from 357,360 square feet of the Project Site, and DA 3 would manage runoff from 48,796 square feet of the Project Site. DAs 1 and 3 will route storm water flows to proposed modular wetland units, while DA 2 will convey storm water flows through an on-site, underground infiltration chamber to be pretreated and infiltrated. All three drainage areas will outlet to the proposed 12-foot by 8-foot RCB storm drain which will discharge into the relocated 15th Street Basin.

As detailed in the preliminary WQMP, development of the Project would require DAs 1 through 3 to respectively capture a minimum of 737 cubic feet ($ft^3$), 18,155 $ft^3$, and 2,879 $ft^3$ of storm water

[46] *Water Quality Management Plan for Tract Number 20245.* Form 4.3-2. Proactive Engineering Consultants, Inc.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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runoff in order to ensure post-development storm water runoff does not exceed pre-development storm water runoff volumes.[47] Due to conflicts with existing and proposed utilities, as well as a lack of useable space on site to support infiltration, LID BMPs to serve DAs 1 and 3 will be comprised of biofiltration modular wetland units sized to treat a minimum 0.05 cubic feet per second (cfs) for DA 1 and 0.11 cfs for DA 3.[48] The on-site underground infiltration chamber LID BMP is designed and shall be constructed to capture 18,217 $ft^3$ of storm water runoff for infiltration[49] prior to discharging overflow to the proposed 12-foot by 8-foot RCB storm drain which will discharge into the relocated 15th Street Basin. According to the WQMP, the design capture volume (DCV) of the proposed underground infiltration chamber LID BMP would satisfy the estimated detention volume needed post-development for the Project.

To ensure the treatment capacity and DCV of the proposed LID BMPs serving DAs 1 through 3 would satisfy the treatment and detention volumes needed post-development for the Project, **Mitigation Measure HYD-3** is proposed.

**HYD-3** Prior to the issuance of a grading permit, the Applicant shall submit a Final Water Quality Management Plan (WQMP) to the City of Upland for review and approval. Prior to grading permit approval, the Project shall provide evidence that the Project design features identified in the Final WQMP have been fully incorporated into the Project plans. In accordance with the *Technical Guidance Document for Water Quality Management Plans* prepared for the County of San Bernardino Areawide Stormwater Program, National Pollutant Discharge Elimination System Permit Number CAS618036, Order Number R8-2010-0036, the Final WQMP shall confirm performance standard calculations for each of the Project Site's drainage areas. Specifically, the Final WQMP shall detail low impact development (LID) best management practices (BMPs) designed to retain the Project Site's minimum storm water treatment capacity and design capture volume to ensure post-development storm water runoff volume or time of concentration for the 2-year frequency storm shall not exceed that of the pre-development condition by more than five percent. The proposed LID BMPs specified in the Final WQMP shall be incorporated into the grading and development plans submitted to the City for review and approval. Periodic maintenance of any required BMPs, including landscaped areas, during Project occupancy and operation shall be in accordance with the schedule outlined in the WQMP. This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

The Final WQMP would be reviewed and approved as a routine action during the processing of the Project by the City; therefore, it is reasonable that the required measures and features detailed in the Final WQMP to safeguard the existing drainage pattern of the Site and area would be

[47] *Ibid.* Form 4.2-1. Performance standard calculations are preliminary and will be confirmed upon submittal of a Final Water Quality Management Plan to the City.

[48] *Ibid.* Form 4.3-8. Performance standard calculations are preliminary and will be confirmed upon submittal of a Final Water Quality Management Plan to the City.

[49] *Ibid.* Table I: Drainage Area 2 BMP Infiltration Time Design Calculations. Performance standard calculations are preliminary and will be confirmed upon submittal of a Final Water Quality Management Plan to the City.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| incorporated into the Proposed Project. Adherence to **Mitigation Measures HYD-1** through **HYD-3** and measures included in the SWPPP, NPDES permit, and WQMP would reduce potential surface and groundwater quality impacts to a **less than significant** level. | | | | |
| b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that project may impede sustainable groundwater management of the basin? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated*. Domestic water for the City and the Project Site is provided by the City of Upland and San Antonio Water Company (SAWCo). The majority of the City's water comes from the Cucamonga, Chino, and Six Basins[50] groundwater basins, as well as surface water from the SAWCo, recycled water from the Water Facilities Authority (WFA), and imported surface water purchased from the Metropolitan Water District (MWD).[51]<br><br>Although the Project Site's existing land use designation is Public Utilities--Flood Control/Recharge, and the Project includes a proposed GPA to Villa Serena Specific Plan (SP), the Project would reconfigure the existing on-site 15th Street Basin adjacent to the east in order to maintain adequate local flood control and recharge potential. The reconfigured 15th Street Basin will measure approximately 1,056 feet long by 120 feet wide with an approximate 21-foot depth below grade at the western end and a 7-foot depth below grade at the eastern end. The on-site runoff will be collected by grated inlets within each lot and two curb inlets and conveyed to a proposed 12-foot by 8-foot RCB, which will discharge into the 15th Street Basin. Through implementation of **Mitigation Measure HYD-3**, storm water runoff would be infiltrated on site at volumes that would not exceed the predevelopment condition by more than five percent, and any storm water overflow from all three on-site DAs would outlet to the proposed 12-foot by 8-foot RCB storm drain which will discharge into the reconfigured portion of the 15th Street Basin.<br><br>The Project does not propose direct additions to or withdrawals of groundwater. Furthermore, the proposed construction does not reach depths that would impair or alter the direction or rate of flow of groundwater. Additional Project design features incorporated into the Project to maximize groundwater infiltration, such as roof downspouts draining into pervious, landscaped areas and maintenance of existing surface flows across the Project Site into biofiltration modular wetland units and an underground infiltration basin, would further facilitate groundwater recharge. Periodic maintenance of any required modular wetland units and infiltration basin and landscaped areas during Project occupancy and operation shall be in accordance with the schedule outlined in the WQMP. Through implementation of **Mitigation Measure HYD-3**, no net change in the amount of water recharged into local groundwater would occur; therefore, potential impacts related to the management, quality, availability, and recharge would be reduced to a **less than significant** level. | | | | |

[50] The Six Basins are comprised of the Ganesha, Live Oak, Pomona, Lower Claremont Heights, Upper Claremont Heights and Canyon Basin.

[51] *Final 2015 Urban Water Management Plan, Inland Empire Utilities Agency.* Table 3-2: IEUA Retail Agencies Projected Water Supply (AF). June 2016.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| c) Substantially alter the existing drainage pattern of the Site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: | | | | |
| i) Result in substantial erosion or siltation on or off site? | ☒ | ☐ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* The Project Site currently functions as a flood control basin (15th Street Basin), and construction of the proposed 65 single-family residential units and associated infrastructure improvements will require modification of the remaining portion of the 15th Street Basin east of the proposed development. Development of the Proposed Project (buildings and pavement) would alter the amount of existing pervious surface area and the amount of generated runoff. Construction would disturb paved and/or vegetated surfaces and expose on-site soils to erosion and siltation potential. Modification of the remaining portion of the 15th Street Basin will result in 3:1 (horizontal:vertical) slopes with a maximum height of approximately 20 feet. Based on stability analysis, the proposed slopes the modified basin have been determined to "grossly stable and geotechnical suitable."[52]

Pursuant to **Mitigation Measure HYD-2**, the Project Applicant shall submit to and receive approval from the City of Upland of an SWPPP prior to the issuance of a grading permit. The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. In addition, the SWPPP shall emphasize structural and nonstructural BMPs to control sediment and non-visible discharges from the Site. The SWPPP shall include inspection forms for routine monitoring of the Site during both the demolition and construction phases to ensure NPDES compliance and that additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary. The SWPPP shall address the potential for an extended and discontinuous construction period based on funding availability.

Through implementation of **Mitigation Measure HYD-3**, the Applicant shall prepare a Final WQMP to ensure storm water runoff would be infiltrated on-site at volumes that would not exceed the predevelopment condition by more than five percent, and any storm water overflow from all three on-site DAs would outlet to the proposed 12-foot by 8-foot RCB storm drain which will discharge into the modified 15th Street Basin described above. Additional Project design features incorporated into the Project, such as roof downspouts draining into pervious, landscaped areas and maintenance of existing surface flows across the Project Site into biofiltration modular wetland units and an underground infiltration basin, would further maintain the Site's existing drainage pattern and prevent erosion and siltation. Periodic maintenance of any required modular wetland units and infiltration basin and landscaped areas during Project occupancy and operation shall be in accordance with the schedule outlined in the WQMP. With implementation of **Mitigation Measures**

[52] Slope Stability Evaluation – New Basin, Tentative Tract 20245, Upland, San Bernardino County, California, GeoTek, Inc., September 16, 2019.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **HYD-2** and **HYD-3**, impacts related to substantial alteration of the existing drainage pattern of the Site or area or substantial increase in the rate or amount of surface runoff in a manner which would result in substantial erosion or siltation would be reduced to a **less than significant** level. | | | | |
| ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* Development of the Project Site and modification of the remaining portion of the 15th Street Basin reduces the overall area of the existing basin, but the proposed improvements to the 15th Street Basin would provide the required storage volume by increasing the depth of the ponding in the basin. In the existing condition, the basin ponds to an elevation of 1,422.6 feet during a 100-year storm event. In the proposed condition, the basin would pond to an elevation of approximately 1,426 feet.[53] This increased depth will provide 0.5 feet of freeboard between the emergency spillway crest and the 100-year water surface elevation. The emergency spillway shall be constructed for the 1,000-year event (1.35 × 100-year flow rate) in accordance with San Bernardino County Detention Basin Design Criteria, with the required freeboard to the top of the dam embankment to be above the 1,000-year water surface elevation. Using a 9-foot wide by 1.5-foot high opening, the maximum water surface elevation is projected to be 1,426.1 feet with a peak discharge of 246.7 cfs. This meets the peak discharge and maximum 100-year water surface elevation goals.

The existing basin would be retrofitted to accommodate a trapezoidal emergency spillway with a crest at an elevation of 1,426.6 feet amsl. The emergency spillway, having a base of 16 feet and a top width of 48.4 feet, would be installed at the end of Grove Avenue. Combined with the proposed box weir outlet system, potential impacts associated with Project development would be minimized. The box weir outlet system would be designed to pass through the 200- to 500-year storm, with the emergency spillway providing discharge capacity for larger events. As the box weir outlet system can accommodate flows well in excess of the 100-year storm event, it is unlikely flows over the emergency spillway would occur during foreseeable storm events[54].

Through implementation of **Mitigation Measure HYD-3**, the Applicant shall prepare a Final WQMP to ensure storm water runoff would be infiltrated on site at volumes that would not exceed the predevelopment condition by more than five percent, and any storm water overflow from all three on-site DAs would outlet to the proposed 12-foot by 8-foot RCB storm drain, which will discharge into the modified 15th Street Basin. With implementation of **Mitigation Measures HYD-2** and **HYD-3**, changes in the existing drainage pattern of the Site would not substantially increase the rate or amount surface runoff; therefore, on- or off-site flooding impacts would be reduced to a **less than significant** level.

[53] *15th Street Basin Modifications Review and Recommendations*. $Q_3$ Consulting. June 29, 2018, revised July 31, 2018 (Appendix G3).
[54] *15th Street Basin Modifications – Spillway and Bypass Alternatives*. Q3 Consulting, September 10, 2019.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| iii) Create or contribute runoff that would exceed the capacity of existing or planned storm water drainage systems or provide substantial amounts of polluted runoff? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated.* Please refer to the Response to Checklist Question 3.3.10c(i) and (ii). | | | | |
| d) In flood hazard, tsunami or seiche zones, risk release of pollutants due to project inundation? | ☐ | ☐ | ☐ | ☒ |
| *No Impact.* The Proposed Project is not located within an area subject to flood hazards from a 100-year flood (1 percent annual flood), as identified by the City and the Federal Emergency Management Agency (FEMA).[55, 56]<br><br>According to the City's General Plan EIR, the Project Site is located within the inundation zone of the San Antonio Dam, which is located 3.3 miles northwest of the Project Site.[57] San Antonio Dam was designed to withstand the strongest possible earthquake that could occur in the area. Further, flooding that would occur from a dam breach would be reduced by the number and capacity of settling basins that are located south of the dam.[58] Therefore, dam inundation is considered by the City to be an extremely remote possibility.[59]<br><br>The Project Site is not located near or adjacent to a lake or ocean; therefore, there is no potential for inundation of the Site by a seiche (a wave or oscillation of the surface of water in an enclosed or semi-enclosed basin) or tsunami; therefore, no potential for inundation from these events would occur.<br><br>General Plan Policy SAF-2.13 requires the City to plan for the evacuation of people from areas subject to inundation from possible failure of the San Antonio Dam. In the event of an emergency, the City's Emergency Operations Plan would be implemented. Due to limited potential for inundation of the site, compliance with the procedures identified in the Emergency Operations Plan, would reduce potential impacts related to the release of pollutants during any inundation event would be **less than significant**. No mitigation is required. | | | | |
| e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* Please refer to the Response to Checklist Questions 3.3.10a and b. | | | | |

[55] *City of Upland General Plan.* Figure SAF-2 100-Year and 200-Year Flood Zones. City of Upland, September 2015.
[56] *Flood Insurance Rate Map No. 06071C8607H.* National Flood Insurance Program. Panel 8607H. Map Revised August 28, 2008.
[57] Section *5.13 Hydrology and Water Quality*, *City of Upland General Plan Final Program EIR.* Pages 5.13-15 and 5.13-34. City of Upland, September 2015.
[58] *Ibid.*
[59] *Ibid.*

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

### 3.3.11 Land Use and Planning

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Physically divide an established community? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* The Site is bounded on north by a golf course, on the west by a private residential community, on the south by 15th Street beyond, which are single-family residential uses, and on the east by an extension of the existing flood control basin beyond which are single-family and multifamily residential uses. Primary access to the neighborhood is along 14th Street north to Alta Avenue, Monte Verde Avenue, or Grove Avenue to 15th Street, as the adjacent golf course and private residential community already cut off access to the neighborhood from the north and west.

Access to the Project Site is proposed along 15th Street via a primary ingress/egress gate enhanced with streetscapes and an entry monument to impart a strong sense of arrival into the proposed community. A secondary access along the western end of the Project Site will provide residential entry/exit and also facilitate entry/exit for emergency vehicles. Both access points are proposed to be gated, and all interior streets are proposed to be privately owned and maintained by a homeowner's association.

The Project is the development of residential uses consistent with the existing residential pattern of development surrounding the Project Site. Existing residential uses occur adjacent to the west and south, and additional residential uses occur within the golf course adjacent to the north and beyond the flood control basin adjacent to the east. None of the surrounding residential communities are interconnected, as they exist as enclaves independent and separate from each other. Furthermore, the existing flood control basin physically divides these communities currently. Development of the Proposed Project would fill in the flood control basin on site, relocate and expand the basin adjacent to the east in an area already serving as flood control, and represent a continuation of the existing residential uses in the immediate vicinity of the Project Site. Therefore, the Project would not physically divide an established community. **No impact** would occur and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy or regulation for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* The Proposed Project includes a General Plan Amendment (GPA) from Public Utilities--Flood Control/Recharge (PU-FC/R) to Villa Serena Specific Plan (SP). Pursuant to California Government Code Section 65450 et seq., Specific Plans provide detailed land use and infrastructure plans and policies for a certain geographic area and must be consistent with an applicable General Plan.

The proposed Specific Plan is a comprehensive plan for development of 65 single-family detached residential units at a density of 7.1 dwelling units per acre with on-site active and passive recreational amenities to be provided within the common area open space. Table 3.3.11A details the Proposed Project's consistency with the General Plan goals and policies pertaining to land use.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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**Table 3.3.11A: Proposed Project's Consistency with the City's General Plan**

| City's General Plan Policy or Goal | Proposed Project's Consistency with General Plan Goal or Policy |
|---|---|
| **Land Use Element Goal LU-1: A viable community with a mix of land uses and building types that offer a wide range of choices to live, work, shop and participate in civic, cultural, open space, and recreational opportunities.** | |
| **Policy LU-1.2: Permitted Densities and Intensities.** Ensure existing and future zoning designations correspond to the permitted density and intensity ranges as listed in Table LU-1 of the Land Use Element. | **Consistent.** The Project's development of the flood control detention basin with SFR-M uses between existing single-family homes to the south and west and the golf course with multifamily homes (duplexes) to the north is consistent with the General Plan's intended implementation of the SFR-M land use in transition zones between lower-density residential uses and higher-density commercial, industrial, and multifamily residential land uses.<br><br>The Proposed Project's contribution to growth would represent a negligible amount of the future growth forecast in the City (approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households). The addition of 189 residents within the City would result in population growth within the City; however, this additional population is consistent with the City, County, and regional (SCAG) growth projections depicted in Table 3.3.10B.<br><br>Although the Project Site's existing land use designation is PU-FC/R and zoning designation is PB/FC, the proposed GPA to SFR-M (4 to 10 dwelling units per acre) and zone change to SP, resulting in an increase in residential uses beyond that which was planned for by the City at General Plan buildout, would contribute to the balance of the City's current and future jobs-to-housing ratio consistent with both the SCAG forecasts and the growth forecasts for the City, as detailed in Table 3.3.13A. The Project would accommodate overall planned growth in the City and the SCAG region, and it would contribute to meeting the City's Regional Housing Needs Assessment (RHNA) requirement. |
| **Policy LU-1.3: Strategic Growth.** Concentrate growth in strategic locations that strengthens the City's economic base, offers new housing opportunities, maximizes available and planned infrastructure, and fosters the development and use of transit and multi-modal transportation. These areas include Historic Downtown Upland, Foothill Boulevard, the Southeast Quadrant, College Heights, Mountain Avenue, along the Interstate 10 corridor, and in the 9th Street Industrial area. | |
| **Policy LU-1.4: Complete and Balanced Community.** Foster new land uses and building types that contribute to City revenues and increase employment while also ensuring the provision of sufficient housing, shopping, civic, cultural, open space, and recreational opportunities. | |
| **Policy LU-1.5: Range of Housing Types and Densities.** Provide high-quality housing in a range of types, densities, and unit sizes that meets the housing needs of residents of all income levels. | |
| **Policy LU-1.6: Jobs-Housing Match.** Encourage new employment opportunities that match the range of housing types to make it possible for people to live and work in Upland. | |
| **Land Use Element Goal LU-4: A community whose land use patterns focus growth in ways that are supportable and environmentally responsible, including the implementation of smart growth practices and the reduction of greenhouse gas emissions consistent with Assembly Bill (AB) 32, Senate Bill (SB) 375, the Regional Transportation Plan and Sustainable Community Strategy.** | |
| **Policy LU-4.1: Infill Development**. Encourage mixed-use, infill development on brownfields or underutilized parcels, | **Consistent.** The City has determined the 9.2 acre portion of the flood control detention basin comprising the Project Site to be a surplus parcel which can be used as a development Site for residential uses with the |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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| particularly near public transit and within the historic downtown.<br>**Policy LU-4.2: Balance Commercial and Residential Development**. Strive to balance commercial and residential development within the City to provide services for residents and a supportive local clientele for businesses.<br>**Policy LU-4.3: Jobs Housing Balance**. Encourage a balance between jobs, workforce skills, and housing supply.<br>**Policy LU-4.5: Infrastructure Improvements.** Preserve and maintain the City's infrastructure and give preference to infrastructure improvements that support or enhance desired land uses and Projects. | remaining 11.1 acres of the flood control detention basin as adequate for continued flood control operations pursuant to completion of modifications to portions of the basin made as part of the Project. Access for flood control detention basin maintenance vehicles is provided through the Project Site with a gated entry to the basin located at the easterly edge of the Project boundary.<br>The City's 2012 jobs-to-housing ratio is well above the San Bernardino County job/housing ratio but slightly lower than the SCAG regional job/housing ratio; therefore, the City may be considered "jobs balanced" relative to the greater SCAG region. By 2040, however, the City's jobs-to-housing is expected to exceed both the County's and SCAG's jobs-to-housing ratios, as detailed in Table 3.3.13A, meaning the City would be relatively "jobs rich" and "housing poor," and additional housing within the City would be required to balance the jobs-to-housing ratio at the local level. By developing housing, the Project would support the balance of jobs to housing in the City so that residents would not have to travel far to work. Therefore, a balanced jobs-to-housing ratio generally fulfills several key issues and policies of the AQMP and City's CAP through the reduction in regional vehicle miles traveled in order to reduce vehicle GHG emissions. |
| **Land Use Element Goal LU-5: A community that facilitates options for the use of cars, walking, biking, and the use of public transportation.** | |
| **Policy LU-5.5: Pedestrian Safety.** Encourage the creation of safe, walkable environments that include elements such as wide, smooth sidewalks, good lighting, safe crosswalks, clear signage, curb bulb-outs, curb cuts, street furniture, trees and traffic-calming measures which allow people of all ages and abilities to exercise and safely access public transportation, community centers, schools and goods and services. | **Consistent.** The proposed Specific Plan is designed to provide for a pedestrian and bicycle friendly circulation system facilitating connectivity within the community and connecting to 15th Street where pedestrians and bicyclists can access public streets and sidewalks which connect to existing adjacent residential neighborhoods, a public Community Park, and to retail commercial centers in the vicinity of the Project Site.<br>Common area open space within the community offers active and passive recreational amenities for residents and a community gathering place for residents. Homes are planned to front onto streets, enabling residents to have their "eyes on the street," promoting a safe hometown feel and encouraging interaction among neighbors. |
| **Land Use Element Goal LU-6: A community that encourages complementary development and maintenance of existing development.** | |
| **Policy LU-6.1: Quality Development.** Ensure that development is attractive and promotes harmony in the visual relationships and transitions between newer and older buildings.<br>**Policy LU-6.2: Compatibility of Uses.** Control the location, concentration and operations of land uses that have potential impacts on surrounding development through effective design principles, adequate buffering, and enforcement of regulatory documents. | **Consistent.** The new community planned as part of the Specific Plan incorporates the traditional housing styles of the City, while also reflecting the architecture of recently built neighborhoods in the Project vicinity. The use of Spanish roof tiles, gable end details, and delicate metal rails reflects the classic Spanish style of the historical Upland communities, while the vertical corner details, symmetry, and arched openings of the Italianate style, and the corbels, stone siding, and steep roof pitches of the French Country architectural style capture the details of the past and present styles of Upland homes.<br>Construction of new Project roadways and infrastructure is planned to connect to existing facilities located adjacent to the Project Site. The proposed plan utilizes existing circulation and transportation facilities, reducing the need for construction of additional arterial and major roadway extensions or improvements to serve the Project Site.<br>The Project's development of the flood control detention basin with SFR-M |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

| | |
|---|---|
| | uses between existing single-family homes to the south and west and the golf course with multifamily homes (duplexes) to the north is consistent with the planned implementation of the SFR-M land use in transition zones between lower-density residential uses and higher-density commercial, industrial, and multifamily residential land uses, as detailed in the General Plan. |

Source: *Land Use Element, City of Upland General Plan*. City of Upland. September 2015.

As detailed in Table 3.3.11A, the Proposed Project is consistent with the above-referenced General Plan Land Use goals and policies, which are designed to enhance community services, reduce air pollution, GHG emissions, and traffic congestion by promoting quality development, fostering land use compatibility, and balancing the City's jobs-to-housing ratio.

SCAG functions as the Metropolitan Planning Organization (MPO) for six counties, including San Bernardino County, wherein the Project is located. As the designated MPO, SCAG is federally mandated to research and plan for transportation, growth management, hazardous waste management, and air quality. SCAG's main responsibilities under state and federal law are preparing the Regional Housing Needs Assessment (RHNA) and the Regional Transportation Plan (RTP). Although SCAG does not have formal regulatory authority and cannot directly implement land use decisions, SCAG guides land use planning for the southern California region through intergovernmental coordination and consensus building. SCAG's Regional Council adopted the latest [2016–2040] Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) on April 7, 2016. The analysis of the Proposed Project's impacts to the City's growth forecast is based on the latest data provided in SCAG's 2016–2040 RTP/SCS.[60]

Typically, growth-inducing potential of a Project would be considered significant if it fosters growth or a concentration of population in excess of what is assumed in pertinent master plans and land use plans. Significant growth impacts could also occur if the Project provides infrastructure or service capacity to accommodate growth beyond the levels currently permitted by local or regional plans and policies. As detailed in response to Checklist Question 3.3.14a, the City will need to accommodate a total of 1,589 units in various income categories, including 191 extremely low-income, 191 very low-income, 260 low-income, 294 moderate-income, and 653 above moderate-income housing units in order to meet its projected housing needs detailed in the RHNA.[61] New single-family homes in the City are selling for over $500,000. In the vast majority of cases, these products are built on standard small lots with a density of 7 to 10 units per acre, and Sites zoned at such lower densities are assumed to be capable of only accommodating single-family homes affordable to above moderate-income households.[62] Since the Project proposes single-family homes at a density of approximately 7.1 dwelling units per acre, the proposed residential units would contribute to meeting the City's above moderate-income RHNA requirement.

[60] *Final 2016/2040 Regional Transportation Plan/Sustainable Communities Strategy.* Table 11 in Demographics & Growth Forecast Appendix. Adopted April, 2016. Southern California Association of Governments.

[61] *Housing Element, 2013-2021.* Table 4-1: Upland Regional Housing Needs Allocation, 2013-2021. City of Upland General Plan. Housing Element Adopted January 27, 2014.

[62] *Ibid.* Page 61.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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The latest figures provided by the California Department of Finance indicate the population of the City is approximately 77,017 persons.[63] Development of the Proposed Project and other Projects in the City of Upland and in San Bernardino County would lead to increases in population, housing, and employment. The Proposed Project would involve development of 65 residential units (189 new residents).[64] However, as detailed in Table 3.3.11B, SCAG estimates that there could be approximately 81,700 people, 28,900 households, and 43,500 jobs in the City by 2040. The Proposed Project's growth would represent a negligible portion of the future growth forecasts in the City (approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households). The addition of 189 residents within the City would result in population growth within the City; however, this additional population is consistent with the City, County, and regional (SCAG) growth projections depicted in Table 3.3.11B.

The General Plan does not specify or anticipate when complete buildout would occur, as long-range demographic and economic trends are difficult to predict. The designation within the General Plan of a Site for a certain use does not necessarily mean that the Site would be developed with that use during the planning period, as most development depends on property owner initiative. Although the Project Site's existing land use designation is PU-FC/R and zoning designation is PB/FC, the proposed GPA to Villa Serena Specific Plan, resulting in an increase in residential uses beyond that which was planned for by the City at General Plan buildout, would contribute to the balance of the City's current and future jobs-to-housing ratio consistent with both the SCAG forecasts and the growth forecasts for the City, as detailed in Table 3.3.14A. The Project would accommodate overall planned growth in the City and the SCAG region, and it would contribute to meeting the City's RHNA requirement.

**Table 3.3.11B: SCAG Demographic Forecasts**

| Demographic Characteristic | 2012 | 2040 |
|---|---|---|
| ***Population*** | | |
| City of Upland | 74,700 | 81,700 |
| San Bernardino County | 2,068,000 | 2,731,300 |
| Southern California Association of Governments* | 18,300,000 | 22,100,000 |
| ***Households*** | | |
| City of Upland | 25,900 | 28,900 |
| San Bernardino County | 615,300 | 854,300 |
| Southern California Association of Governments* | 5,900,000 | 7,400,000 |
| ***Employment*** | | |
| City of Upland | 31,700 | 43,500 |
| San Bernardino | 659,500 | 998,100 |
| Southern California Association of Governments* | 7,400,000 | 9,900,000 |

63 *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011–2018 with 2010 Census Benchmark.* State of California Department of Finance. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/ (accessed September 27, 2018).

64 The latest statistical figures published by SCAG's Local Profiles Report for the City of Upland in May 2017 reveal the City's average household size is 2.9 persons per housing unit. (2.9 × 65 housing units = 189 persons).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

Source: *Final 2016/2040 Regional Transportation Plan/Sustainable Communities Strategy.* Table 11 in Demographics & Growth Forecast Appendix. Adopted April, 2016. Southern California Association of Governments.

* Rounded to the nearest hundred-thousand.

The 2016–2040 RTP/SCS analyzed the region's transportation system, future growth projections, and potential funding sources in order in order to develop a long-term framework for transportation improvements and maintenance.[65] The RTP includes policies and regulations set forth to ensure development within the SCAG regional area is within planned and forecast socioeconomic projections. As part of the RTP, SCAG developed an SCS, which was required by Senate Bill 375, the Sustainable Communities Act of 2008. The SCS is intended to combine land use and transportation planning with the overall goal of reducing greenhouse gas emissions generated by vehicle travel.

The Project proposes residential uses on a property surrounded by low density and medium density residential uses. The City's 2012 jobs-to-housing ratio is well above the San Bernardino County job/housing ratio but slightly lower than the SCAG regional job/housing ratio; therefore, the City may be considered "jobs balanced" relative to the greater SCAG region. By 2040, however, the City's jobs-to-housing is expected to exceed both the County's and SCAG's jobs-to-housing ratios, as detailed in Table 3.3.14A, meaning the City would be relatively "jobs rich" and "housing poor," and additional housing within the City would be required to balance the jobs-to-housing ratio at the local level. By developing housing, the Project would support the balance of jobs to housing in the City so that residents would not have to travel far to work. Therefore, a balanced jobs-to-housing ratio generally fulfills several key issues and policies of SCAG's 2016–2040 RTP/SCS through the reduction in regional vehicle miles traveled in order to reduce vehicle emissions. Additionally, the proximity of the Project Site within walking and biking distance to existing recreational and commercial facilities can help to reduce automobile trips to and from the Project Site. The connection of the Project street and walkway system to 15th Street provides for on-street bicycle and pedestrian connectivity within the community and connectivity to 15th Street continuing bike and pedestrian access to commercial services located at North Campus Avenue and 19th Street, approximately one mile to the north of the Project Site, and to Sierra Vista Park located approximately one mile west of the Project Site and/or Red Hill Park located approximately one mile east of the Project Site.

Table 3.3.8A details the Project-specific GHG emissions, and the discussion in response to Checklist Question 3.3.8b concludes the Project is designed and will be implemented in accordance with the City's CAP and will not conflict with the GHG and vehicle miles traveled reduction measures identified in State (AB 32), regional (SCAG RTP/SCS), and local (General Plan and CAP) plans adopted for the purposes of avoiding or mitigating adverse environmental effects. Impacts would be **less than significant** and no mitigation is required.

[65] *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability, and a High Quality of Life*. Southern California Association of Governments. April 2016.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.12 Mineral Resources**<br>Would the Project: | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☒ | ☐ |
| b) Result in the loss of availability of a locally-important mineral resource recovery Site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* The Project Site is located within Mineral Resource Zone 2 (MRZ-2).[66] MRZ-2 is defined as:

> *Areas where adequate information indicates that significant mineral resources are present, or where it is judged that a high likelihood for their presence exists. Land included in MRZ-2 is of prime importance because it contains known economic mineral deposits.*[67]

The State Geologist is responsible for identifying and calculating the amount of aggregate resources contained in areas classified as MRZ-2. The State Geologist further limits the aggregate resource calculations to areas within "Sectors," areas classified as MRZ-2 that have current land uses deemed compatible with potential mining. Compatible land uses are defined as those that are non-urbanized or that have very low-density residential developments (one dwelling unit per ten acres or less), land without high-cost improvements, and land used for agriculture, grazing, or open space. Urbanization and/or incompatible land uses are defined as improvements of high cost, such as high-density residential developments, intensive industrial developments, commercial developments, and major public facilities.

The identification of aggregate resources provides local governments information on areas that remain accessible for extraction. The criteria for identifying resource areas do not consider land use commitments that may restrict the accessibility to the resource; therefore, the amount of available resource may be overestimated. Through the development of local General Plans, it is expected that local jurisdictions will identify areas suitable for the extraction of aggregate and other materials.

The Site is currently designated for flood control, and the Project includes a GPA from PU-FC/R to Villa Serena Specific Plan and development of 65 single-family residential dwelling units in an area of the City currently developed primarily with residential uses. No mineral extraction or processing activity occurs on site or vicinity, nor is the Site designated for such uses in the General Plan or Zoning Code.[68,69]

Because the developed areas surrounding the Site contains a considerable amount of residential

[66] *Mineral Land Classification Map, Aggregate Resources Only, Claremont-Upland P-C Region. Ontario Quadrangle*, Special Report 143 Plate 6.8. State of Calif. Dept. of Conservation, 1984.

[67] *Guidelines for Classification and Designation of Mineral Lands,* Department of Conservation State Mining and Geology Board. Page 4. http://www.conservation.ca.gov/smgb/guidelines/documents/classdesig.pdf (accessed July 30, 2018).

[68] *Chapter 1 Land Use Element, City of Upland General Plan*, Figure LU-1: General Plan Land Use, City of Upland, September 2015.

[69] *Zoning Map.* City of Upland Zoning Code Update. Map Date: September 14, 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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land uses, sand and gravel operation on the Site would be incompatible with regards to noise, dust, truck traffic, and possibly vibration on the surrounding land uses. Furthermore, the Project Site is not located within an area determined locally significant for aggregate resources.[70] Therefore, impacts related to the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or loss of availability of a locally-important mineral resource recovery Site delineated on a local general plan, specific plan or other land use plan would be **less than significant**. No mitigation is required.

### 3.3.13 Noise

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Result in generation of a substantial temporary or permanent increase ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* Section 9.40.020 of the City Municipal Code defines ambient noise as the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise. The Project Site is adjacent to single-family homes on three sides and a golf course with multifamily duplexes adjacent to the north. General ambient noise in the area includes roadway noise, lawn mowers, residents' voices, etc. The Proposed Project would result in the development of single-family homes, which are substantially similar to the surrounding land uses and would result in similar noise sources.

Certain land uses are considered more sensitive to noise than others. Examples of these include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The Project-specific Noise Impact Analysis (Appendix H) identified five sensitive receptors that could potentially be impacted.[71] These receptors include single-family residential homes to the north, south, east, and west of the Project Site, as indicated below.

R1: Located approximately 158 feet north of the Project Site, R1 represents the existing residential outdoor living areas (backyards) across an existing golf course from the Project Site.

R2: Located approximately 48 feet south of the Project Site, R2 represents the existing residential outdoor living areas (backyards) of homes on 15th Street.

R3: Located approximately 83 feet south of the Project Site, R3 represents the existing residential outdoor living areas (backyards) south of 15th Street.

R4: Located approximately 86 feet south of the Project Site, R4 represents the existing

[70] *Section 5.12 Mineral Resources, City of Upland General Plan Final Program Environmental Impact Report,* Exhibit 5.12-2: Local Mineral Resource Zone Map, City of Upland, September 2015.

[71] *Upland Colonies Noise Impact Analysis*. Page 33. Urban Crossroads. July 20, 2018 (Appendix H).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

residential outdoor living areas (backyards) south of 15th Street.

R5: Located approximately 10 feet west of the Project Site, R5 represents the existing residential outdoor living areas (backyards) adjacent to the western Project Site boundaries.

The nearest sensitive receptor is represented by location R5 which is approximately 10 feet west of the Project Site; the next-nearest sensitive receptor is represented by location R2 which is approximately 48 feet south of the Project Site.

**Short-Term Noise Impacts:** Section 9.40.100(M) of the City's Municipal Code limits construction activity between the hours of 7:00 a.m. and 6:00 p.m. on weekdays. The City's General Plan and Municipal Code do not specify any upper limits for construction noise levels. However, General Plan Policy SAF-1.11 requires construction projects to adhere to the City's construction hours and incorporate measures to minimize impacts to nearby sensitive uses.

Construction activities associated with the Proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. Table 3.3.13A provides a summary of the construction noise levels at each receiver location for each construction phase.

No mitigation is required; however, the General Plan Environmental Impact Report indicates construction noise impacts are considered less than significant if construction activity is restricted to between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, and the following noise abatement measures are implemented in accordance with General Plan Policy SAF-1.11.[72] Accordingly, the following Standard Conditions are regulatory requirements implemented as routine actions conditioned by the City that would ensure short-term construction noise impacts remain less than significant.

**Table 3.3.13A: Construction Equipment Noise Level Summary**

| Receiver Location | Construction Stage Noise Level (dBA $L_{max}$) | | | | | |
|---|---|---|---|---|---|---|
| | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Peak Activity[1] |
| R1 | 61.4 | 69.8 | 68.7 | 61.7 | 61.7 | 69.8 |
| R2 | 70.7 | 79.1 | 77.9 | 71.0 | 71.0 | 79.1 |
| R3 | 66.6 | 75.0 | 73.8 | 66.9 | 66.9 | 75.0 |
| R4 | 61.3 | 69.7 | 68.5 | 61.6 | 61.6 | 69.7 |
| R5 | 74.9 | 83.3 | 82.2 | 75.2 | 75.2 | 83.3 |

Source: Table 7-6. *Upland Colonies Noise Impact Analysis.* Urban Crossroads, July 20, 2018 (Appendix H).
[1] Highest noise levels across all stages of Project construction.

**Standard Condition N-1:** Construction activities occurring as part of the Project shall be subject to

[72] *Final Program Environmental Impact Report: General Plan Update (GPU 08-03), Zoning Code Update (ZCU 08-03), Climate Action Plan, and Cable Airport Land Use Compatibility Plan Update. SCH No. 2012041006.* Section 5.7-Noise, Pages 5.7-22 and 5.7-23. City of Upland. September 2015.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| | | the limitations and requirements of Section 9.40.100(M) of the City Municipal Code, which states that construction activities may occur between 7:00 a.m. and 6:00 p.m., Mondays through Fridays. No construction activities shall be permitted outside of these hours or on Saturdays, Sundays, and City holidays except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days while the emergency continues, and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be impaired by the erection, demolition, alteration or repair of any building or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he or she shall further determine that loss or inconvenience would result to any party in interest, he or she may grant permission for such work to be done between the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work. This standard shall be implemented to the satisfaction of the City Building and Safety Division. | | |
| **Standard Condition N-2:** | | Prior to issuance of grading permits, the Applicant shall incorporate the following standards as notes on the grading plan cover sheet to minimize construction noise:<br>• Install sound dampening mats or blankets to the engine compartments of large mobile equipment (greater than or equal to 80,000 pounds) which are capable of a minimum 5 A-weighted decibels (dBA) noise reduction. The dampening materials must be capable of the minimum 5 dBA noise reduction and can be made of commercially-available sound dampening materials, including but not limited to polyurethane foam and vinyl sheeting.<br>• Project construction activities shall comply with the City of Upland Municipal Code requirements.<br>• Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project Site.<br>• The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project Site | | |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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during all Project construction (i.e., to the northern center).

- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

This standard shall be implemented to the satisfaction of the City Building and Safety Division.

Although the construction noise associated with the Project would be higher than the ambient noise in the Project vicinity, it would cease to occur once construction activities are completed. Construction of the Proposed Project would need to occur in compliance with the permissible construction hours identified in the City's Municipal Code. With implementation of **Standard Conditions N-1** and **N-2**, short-term construction-related noise impacts would be **less than significant**. No mitigation is required.

**Long-Term Noise Impacts:** Long-term noise impacts in the Project vicinity may occur from traffic along 15$^{th}$ Street and the proposed residential uses. Peak hour or average noise levels do not completely describe a given noise environment because a peak noise may be disturbing if they occur during times when quiet is most desirable such as evening and sleeping hours. The Community Noise Equivalent Level (CNEL) uses weighted averages of the intensity of a sound, with corrections for time of day, to represent a composite 24-hour noise level. The City uses CNEL to represent their exterior and interior noise standards.

The City's General Plan Policies SAF-1.1 and SAF-1.3 and Table SAF-4 identify the exterior and interior noise levels standards for the Project. For single-family residential land use, the *normally acceptable* exterior noise level standard is 60 A-weighted decibels (dBA) CNEL. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA CNEL in any habitable room with all doors and windows closed.

Chapter 9.40, *Unnecessary Noise,* of the City's Municipal Code establishes base ambient noise levels (BANL) at residential properties to 55 dBA equivalent continuous sound level ($L_{eq}$) from 7:00 a.m. to 10:00 p.m. and 45 dBA $L_{eq}$ from 10:00 p.m. to 7:00 a.m. It is unlawful for any person to create noise at noise-sensitive land uses that causes the sound level to exceed the following:

- The BANL for a cumulative period of 30 minutes in any hour;
- The BANL plus 5 dBA for a cumulative period of more than 15 minutes in any hour;
- The BANL plus 10 dBA for a cumulative period of more than 5 minutes in any hour;
- The BANL plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
- The BANL plus 20 dBA for any period of time.

Table 3.3.13B lists the maximum residential noise levels.

**Table 3.3.13B: Maximum Noise Levels, LN (dBA)**

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

| Receiving Land Use | Time Period | $L_{50}$ | $L_{25}$ | $L_8$ | $L_2$ | $L_{max}$ |
|---|---|---|---|---|---|---|
| Residential (single-family and multifamily) | Day: 7:00 a.m.–10:00 p.m. | 55 | 60 | 65 | 70 | 75 |
| | Night: 10:00 p.m.–7:00 a.m. | 45 | 50 | 55 | 60 | 65 |
| Commercial and Industrial | Anytime | 75 | 80 | 85 | 90 | 95 |

Source: Upland Municipal Code, Chapter 9.40, *Unnecessary Noise*.
CNEL = Community Noise Equivalent Level
$L_{50}$, $L_{25}$, $L_8$, $L_2$ = The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 50%, 25%, 8%, and 2% of a stated time period, respectively.
$L_{max}$ = The maximum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
dBA = A-weighted decibels.

**Traffic Noise:** Impacts from noise associated with traffic is based on information from the Traffic Impact Analysis for the Project (Appendix I). The baseline scenario and with-Project scenario are evaluated to determine potential traffic noise impacts on off-site sensitive land uses.

Guidelines included in the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) handbook were used to evaluate highway traffic-related noise conditions along roadway segments in the Project vicinity. The typical vehicle mix for southern California roadways was used for traffic on these roadway segments.

*On-site.* To predict the future noise environment at residential lots within the Project Site, coordinate information was collected to identify the noise transmission path between the noise source and receiver. The coordinate information is based on the plotting of the residential building in relationship to 15th Street. The exterior noise level impacts at the outdoor living areas (backyards) and first-floor building façade were placed 5 feet above the pad elevation. All second-floor receivers were located 14 feet above the proposed finished floor elevation.

The on-site transportation noise level impacts indicate that the unmitigated exterior noise levels will range from 57.0 to 66.4 dBA CNEL. To satisfy the City's 60 dBA CNEL exterior noise level standard for residential land use, the construction of minimum 6-foot high noise barriers is required for outdoor living areas (backyards) of lots adjacent to 15th Street. With the recommended noise barriers, the future exterior noise levels will range from 57.0 to 59.5 dBA CNEL, which will satisfy the City of Upland 60 dBA CNEL exterior noise level standards for residential land use. Because the proposed 6-foot high wall is a project feature, no significant on-site traffic noise impact would occur and not mitigation is required.[73]

Future exterior noise levels at the first-floor building façades are expected to range from 56.7 to 60.0 dBA CNEL. The first-floor interior noise level analysis shows that the City of Upland 45 dBA CNEL residential interior noise level standard can be satisfied using standard windows and sliding glass doors with minimum STC ratings of 27. Future unmitigated noise levels at the second-floor building façades range from 56.7 to 64.9 dBA CNEL. The City's 45 dBA CNEL residential interior noise level standard can be satisfied using standard windows and sliding glass doors with minimum STC ratings

[73] Table 5-1,. Upland Colonies Noise Impact Analysis. Urban Crossroads, July 20, 2018 (Appendix H).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

of 27. The installation of windows/sliding doors is a standard project feature; therefore, no on-site interior noise impact would occur. No mitigation is warranted.[74]

*Off-site*. For existing traffic volumes on 15th Street, this analysis uses the Average Daily Trip (ADT) volumes identified in the *City of Upland General Plan Final Environmental Impact Report*, Table 5.4-4, were utilized for 15th Street. Based on this document, ADTs on 15th Street total approximately 14,100 vehicles, with 10 percent (1,410) of the vehicles utilizing the road during peak hours. Generally, a doubling of traffic flow is required to generate a perceptible increase in traffic noise. Per the Project-specific traffic impact analysis, the Project will generate 623 daily trips. Of these, 50 and 65 trips will occur within the a.m. and p.m. peak hours, respectively. The traffic generated by the Project is substantially less than the level required to generate any perceptible increase in traffic noise on 15th Street. In the absence of a perceptible increase in noise levels on 15th Street, no long-term traffic noise impact to existing residential uses would occur. In the absence of a significant noise impact, no mitigation is warranted.

It is anticipated Project residences will install ground-level air conditioning (HVAC) units. This equipment typically generates noise levels ranging from 75 to 82 dBA equivalent at 3 feet. With each doubling of distance, noise would drop six dBA; therefore, at 6 feet, noise levels would range from 69 to 76 dBA; at 12 feet, noise levels would range from 63 to 70 dBA; and at 24 feet, noise levels would range from 57 to 63 dBA. The Project includes a perimeter wall which will provide an additional 5dBA of noise attenuation. The nearest sensitive receiver (R5) is located approximately 10 feet west of the Project Site. It is reasonable to conclude Project air conditioning units will be installed near each of the Project units and not at the property line; therefore, distance attenuation and the proposed perimeter wall will reduce noise from air conditioning units to approximately 52 to 58 dBA. This noise level is below the City's exterior noise standard; therefore no impact to existing adjacent uses from Project air conditioning units will occur. In the absence of a significant impact, no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Result in generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☒ | ☐ | ☐ |

*Less than Significant Unless Mitigation Incorporated.*

**Construction Vibration Building Damage and Human Annoyance Potential:** According to the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment, it would take a minimum of 90 vibration velocity in decibels (VdB) (or 0.12 in/sec peak particle velocity (PPV)) to cause damage to buildings extremely susceptible to vibration, and 94 VdB (or 0.20 in/sec PPV) to cause damage to non-engineered timber and masonry buildings. Regarding human annoyance, FTA guidelines allow up to 80 VdB for residential uses and buildings where people normally sleep. Therefore, the FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Project-related vibration impacts due to on-site construction and operational activities.

Groundborne noise and vibration from construction activity would be mostly low to moderate.

[74] Tables 5-2 and 5-3, Upland Colonies Noise Impact Analysis. Urban Crossroads, July 20, 2018 (Appendix H).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

Bulldozers and other heavy-tracked construction equipment generate approximately 87 VdB of groundborne vibration when measured at 25 feet, as detailed in Table 3.3.13C.

**Table 3.3.13C: Vibration Source Levels for Construction Equipment**

| Equipment | Vibration Decibels (VdB) at 25 Feet |
|---|---|
| Small Bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large Bulldozer | 87 |

Source: Table 4-5. *Upland Colonies Noise Impact Analysis.* Urban Crossroads, July 20, 2018 (Appendix H).
[1] Highest noise levels across all stages of Project construction.

At distances ranging from 20 to 168 feet from primary Project construction activities, construction vibration levels are expected to range from 62.2 to 89.9 VdB, as detailed on Table 3.3.13D.

Table 3.3.13D indicates use of large mobile equipment such as a large bulldozer (greater than 80,000 pounds), loaded trucks, and jackhammers in proximity to sensitive receptor R5 would exceed the FTA threshold of 80 VdB for sensitive land uses. This would be a potentially significant impact, and mitigation is required.

**Table 3.3.13D: Unmitigated Construction Equipment Vibration Levels**

| Receiver Location | Distance to Construction Activity (Feet) | Receiver Vibration Level (VdB) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jackhammer | Loaded Trucks | Large Bulldozer | Highest Vibration Level | Threshold Exceeded?[1] |
| R1 | 168 | 33.2 | 54.2 | 61.2 | 62.2 | 62.2 | No |
| R2 | 58 | 47.0 | 68.0 | 75.0 | 76.0 | 76.0 | No |
| R3 | 93 | 40.9 | 61.9 | 68.9 | 69.9 | 69.9 | No |
| R4 | 96 | 40.5 | 61.5 | 68.5 | 69.5 | 69.5 | No |
| R5 | 20 | 60.9 | 81.9 | 88.9 | 89.9 | 89.9 | Yes |

Source: Table 7-9. *Upland Colonies Noise Impact Analysis.* Urban Crossroads, July 20, 2018 (Appendix H).
[1] Does the highest vibration level exceed the FTA maximum acceptable vibration standard of 80 VdB?

**NOI-1** Prior to issuance of grading permits, the Project proponent shall provide evidence to the City that large loaded trucks, mobile equipment greater than or equal to 80,000 pounds, and jackhammers shall not be used within 50 feet of receiver location R5 (the existing residential outdoor living areas adjacent to the western Project Site boundaries) if occupied at the time of Project construction. During construction activities, smaller, rubber-tired mobile equipment (less than 80,000 pounds) or equivalent alternative equipment shall be used within this area during Project construction to reduce vibration effects. This measure shall be implemented to the satisfaction of the City Building and Safety Division.

With implementation of **Mitigation Measure NOI-1** vibration levels at the nearest sensitive receptors (receiver location R5) would be reduced to between 49 VdB and 78 VdB, as indicated in Table 3.3.13E, and construction-related vibration impacts would be reduced to a **less than significant** level.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

**Table 3.3.13E: Mitigated Construction Equipment Vibration Levels**

| Receiver Location | Distance to Construction Activity (Feet) | Receiver Vibration Level (VdB) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jackhammer | Loaded Trucks | Large Bulldozer | Highest Vibration Level | Threshold Exceeded?[1] |
| R5 | 50 | 49.0 | 70.0 | 77.0 | 78.0 | 78.0 | No |

Source: Table 7-9. *Upland Colonies Noise Impact Analysis.* Urban Crossroads, July 20, 2018 (Appendix H).
[1] Does the highest vibration level exceed the FTA maximum acceptable vibration standard of 80 VdB?

**Long-Term Groundborne Noise and Vibration from Vehicular Traffic:** Because the rubber tires and suspension systems of on-road vehicles provide vibration isolation and reduce noise, it is unusual for on-road vehicles to cause groundborne noise or vibration impacts. When on-road vehicles cause such effects as the rattling of windows, the source is almost always airborne noise. Most problems with on-road vehicle-related noise and vibration can be directly related to a pothole, bump, expansion joint, or other discontinuity in the road surface. However, the Proposed Project would have roads with smooth pavement. It is, therefore, assumed that no such vehicular vibration impacts would occur. Additionally, once constructed, the Proposed Project would not contain uses that would generate groundborne vibration. Long-term vibration impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| c) For a project located within the vicinity of a private airstrip or an airport land use plan, or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

*No Impact.* The closest airport in proximity to the Project Site is Cable Airport, located approximately 2.6 miles to the west. As detailed in Map 3A of the Cable Airport Land Use Compatibility Plan (CALUCP), the Project Site is not within any of the Cable Airport Land Use Compatibility Zones[75] or within any of the Future Noise Impact Zones.[76] Therefore, the Project would not expose people residing or working in the vicinity to excessive noise levels. **No impact** would occur and no mitigation is required.

### 3.3.14 Population and Housing

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |

[75] *Map 3A: Compatibility Policy Map, Cable Airport Land Use Compatibility Plan.* City of Upland, 2014.
[76] *Ibid.* Map 3E: Future Noise Impact Area.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

*Less Than Significant Impact.* The latest figures provided by the California Department of Finance indicate the population of the City is approximately 77,017 persons.[77] As indicated in previously referenced Table 3.3.10B, the Southern California Association of Governments (SCAG) anticipates population to continue to grow for the City and the overall Southern California region. SCAG projects the City's population will grow to 81,700 persons by the year 2040.[78] It should be noted that a Council of Governments (COG) is a regional planning and review authority whose membership includes representation from all communities in the designated region. SCAG is the designated COG for Southern California.

The extent to which the new jobs created by a project are filled by existing residents of the City is a factor that tends to reduce the growth-inducing effect of a project. The Proposed Project would create short-term construction jobs during the construction phase. It is anticipated these short-term positions would be filled by workers who, for the most part, would reside in the Project's general vicinity; therefore, construction of the Proposed Project would not generate a permanent increase in population within the Project's vicinity.

The Project is located in a predominantly developed area and would include the construction of 65 single-family residential dwelling units. The latest statistical figures published by SCAG for the City's average household size assume 2.9 persons per housing unit,[79] so the Proposed Project could increase the City's population by approximately 189 persons.

The ratio of jobs to housing units in the City is used by regional planning groups to balance regional traffic commutes to minimize freeway congestion, air pollutant emissions, and greenhouse gas emissions. The jobs-to-housing ratio measures the extent to which job opportunities in a given geographic area are sufficient to meet the employment needs of area residents. This ratio identifies the number of jobs available in a given region compared to the number of housing units in the same region. For example, a region with a jobs-to-housing ratio of 1.5 would indicate that 1.5 jobs exist for every housing unit within that region. The standard used for comparison is the jobs-to-housing ratio of the SCAG region, which is currently 1.25 jobs for every household (Table 3.3.14A). This standard is used because most residents of the region are employed somewhere within the SCAG region. A City or sub-region with a jobs-to-housing ratio lower than the overall standard of 1.25 jobs for every household would be considered a "jobs poor" area, indicating that many of the residents must commute to places of employment outside the sub-region. Table 3.3.14A details the current and potential jobs/housing ratios for the City, County, and SCAG.

The City's 2012 jobs-to-housing ratio is well above the San Bernardino County job/housing ratio but slightly lower than the SCAG regional job/housing ratio; therefore, the City may be considered "jobs balanced" relative to the greater SCAG region. By 2040, however, the City's jobs-to-housing is expected to exceed both the County's and SCAG's jobs-to-housing ratios, meaning the City would be

[77] *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011–2018 with 2010 Census Benchmark.* State of California Department of Finance. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/ (accessed September 27, 2018).

[78] *Final 2016/2040 Regional Transportation Plan/Sustainable Communities Strategy.* Table 11 in Demographics & Growth Forecast Appendix. Adopted April, 2016. Southern California Association of Governments.

[79] *Profile of the City of Upland.* Page 3. Southern California Association of Governments Local Profiles Report 2017. May 2017.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

relatively "jobs rich" and "housing poor," and additional housing within the City would be required to balance the jobs-to-housing ratio at the local level.

**Table 3.3.14A: Existing and Future Jobs/Housing Ratios**

| | 2012 Ratio | 2040 Ratio |
|---|---|---|
| City of Upland | 1.22 | 1.51 |
| San Bernardino County | 1.07 | 1.17 |
| Southern California Association of Governments | 1.25 | 1.34 |

Sources: Data from Table 3.3.10B (SCAG Demographic Forecasts).

The Regional Housing Needs Assessment (RHNA) is mandated by State Housing Law as part of the periodic process of updating local housing elements of General Plans. The RHNA quantifies the need for housing within each jurisdiction during specified planning periods. The RHNA for San Bernardino County is developed by SCAG and allocates to cities and the unincorporated county their "fair share" of the region's projected housing needs. The *5th Cycle RHNA Allocation Plan*, which covers the planning period from October 2013 to October 2021, was adopted by SCAG on October 4, 2012.

The projected housing needs in the RHNA are categorized by income levels (extremely low, very low, low, moderate, and above moderate income) established by the U.S. Department of Housing and Urban Development (HUD). According to the *Allocation Plan* and the Housing Element of the City's General Plan, the City will need to accommodate a total of 1,589 units in various income categories during this time, including 191 extremely low-income, 191 very low-income, 260 low-income, 294 moderate-income, and 653 above moderate-income housing units.[80] New single-family homes in the City are selling for over $500,000. In the vast majority of cases, these products are built on standard small lots with a density of 7 to 10 units per acre, and sites zoned at such lower densities are assumed to be capable of only accommodating single-family homes affordable to above moderate-income households.[81] Since the Project proposes single-family homes at a density of approximately 7.1 dwelling units per acre, the proposed residential units would contribute to meeting the City's above moderate-income RHNA requirement.

Typically, growth-inducing potential of a project would be considered significant if it fosters growth or a concentration of population in excess of what is assumed in pertinent master plans and land use plans. Significant growth impacts could also occur if the Project provides infrastructure or service capacity to accommodate growth beyond the levels currently permitted by local or regional plans and policies. Development of the Proposed Project and other projects in the City and in San Bernardino County would lead to increases in population, housing, and employment. The Proposed Project would involve development of 65 single-family residential units (189 new residents). However, as detailed in previously referenced Table 3.3.11B, SCAG estimates that there could be approximately 81,700 people, 28,900 households, and 43,500 jobs in the City by 2040. The Proposed Project's contribution to growth would represent a negligible amount of the future growth forecast in the City (approximately 0.23 percent of the projected 2040 City population and 0.22 percent of

[80] *Housing Element, 2013–2021.* Table 4-1: Upland Regional Housing Needs Allocation, 2013-2021. City of Upland General Plan. Housing Element Adopted January 27, 2014.

[81] *Ibid.* Page 61.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

the projected 2040 City households). The addition of 189 residents within the City would result in population growth within the City; however, this additional population is consistent with the City, County, and regional (SCAG) growth projections depicted in Table 3.3.11B.

The City's General Plan does not specify or anticipate when complete buildout would occur, as long-range demographic and economic trends are difficult to predict. The designation within the General Plan of a site for a certain use does not necessarily mean that the site would be developed with that use during the planning period, as most development depends on property owner initiative and market tends. Although the Project Site's existing land use designation is Public Utilities-Flood Control/Recharge, the proposed GPA to Villa Serena Specific Plan, resulting in an increase in residential uses beyond that which was planned for by the City at General Plan buildout, would contribute to the balance of the City's current and future jobs-to-housing ratio consistent with both the SCAG forecasts and the growth forecasts for the City, as detailed in Table 3.3.14A. The Project would accommodate overall planned growth in the City and the SCAG region, and it would contribute to meeting the City's RHNA requirement. Additionally, the Project Site is located within an urbanized area and would be connected to existing municipal roadways and utility infrastructure. The Project would relocate a portion of the existing on-site flood control basin adjacent to the east in order to maintain adequate local flood control and recharge, but it would not otherwise include the construction of new roadways or infrastructure beyond that which would serve only the Project Site. Therefore, the Project would not induce substantial population growth in an area, either directly or indirectly. Impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

*No Impact*. The Proposed Project entails development of 65 residential dwelling units on a property that currently does not contain any housing. Therefore, **no impact** relative to the displacement of housing and people would occur. No mitigation is required.

### 3.3.15 Public Services

Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

| | | | | |
|---|---|---|---|---|
| a) Fire protection? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact*. Effective, July 22, 2017, fire protection and emergency medical response services are now being provided by the San Bernardino County Fire District. Specifically, the city service coverage is provided by SBCFD Division 1. The nearest fire station to the Project Site is San Bernardino County Fire Station 164 located at 1825 N Campus Avenue (approximately 1.0 mile northwest of the Project Site) with an estimated 5-minute travel time to the Site. The next nearest fire station to the Project Site is San Bernardino County Fire Station 161 located at 475 North 2nd Avenue

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

(approximately 1.6 miles southwest of the Project Site) with an estimated 7-minute travel time to the Site.

Average time of response to emergencies in the City is seven minutes, and the goal is for the SBCFD to arrive within five minutes or less 80 percent of the time.[82] Through compliance with California Vehicle Code 21806(A)(1), which requires all vehicles to yield to emergency vehicles, travel time between the nearest fire station and the Site is expected to be between five and seven minutes. Therefore, the Project is consistent with the City's response time standard.

The Project includes the construction of 65 single-family homes, which is expected to increase the City's population by approximately 189 persons. This could incrementally increase the demand for fire protection services, but not to the degree that the existing fire stations could not meet the demand. Project design features incorporated into the structural design and layout of the proposed residential units would keep service demand increases to a minimum. For example, General Plan Policies PFS-2.9 and PFS-2.10 require new development, including the Proposed Project, to incorporate adequate emergency water flow, fire-resistant design and materials, early warning systems and evacuation routes, and to identify and mitigate any fire hazards during the development review process.[83] Additionally, the City maintains mutual aid agreements with surrounding cities (e.g., Rancho Cucamonga, Ontario, Montclair, and Claremont), which allow for the services of nearby fire departments to assist the City during major emergencies. Therefore, it is possible the Rancho Cucamonga Fire-San Bernardino Road Station at 9612 San Bernardino Road, Rancho Cucamonga, approximately 3.3 miles to the east with an estimated 8-minute travel time would provide fire protection services in the event of an emergency.

The Proposed Project design would be submitted to and approved by the SBCFD prior the issuance of building permits. Furthermore, the Project would be required to pay Development Impact Fees (DIFs) used to fund capital costs associated with constructing new public safety structures and purchasing equipment for new public safety structures. Any future construction of new or expansion of existing fire protection facilities would be subject to Project-level environmental review and Site-specific mitigation as appropriate in order to ensure significant environmental impacts are avoided or mitigated. However, the addition of 65 single-family residential structures represents approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households, which is a negligible amount of the future growth forecasts in the City. Therefore, constructing the Project in accordance with local policies would not require new or physically altered fire protection facilities, the additional construction of which could cause significant environmental impacts. Therefore, impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Police protection? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Police services within the City are provided by the Upland Police Department (UPD). The nearest UPD station is located at 1499 West 13th Street (approximately 3.3 miles west of the Site). The UPD determines response times based on the priority levels. Priority 1,

[82] *Section 5.17. Fire Protection, City of Upland General Plan Final Program Environmental Impact Report,* Page 5.17-5, City of Upland, September 2015.
[83] *Ibid.*

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

which are calls regarding immediate threat of life or immediate need for assistance, has a target response time of 5 minutes. There are no target response times for calls with priority ratings of 2 through 6.

The City monitors staffing levels to ensure that adequate police protection and response times continue to be provided as individual development Projects are proposed and on an annual basis as part of the City Council's budgeting process. Therefore, the Proposed Project would not result in a significant reduction in police response times because of the continual monitoring of police staffing levels by the City.

Funding for new police facilities commensurate with the increased demand for services in the City would be provided from capital improvement fees levied on new development. These DIFs are one-time charges applied to new development and are imposed to raise revenue for the construction or expansion of capital facilities located out of the Project boundaries of a new development that benefit the area. DIFs enable the City to collect fair-share fees from new development Projects to fund new infrastructure and services. DIFs are collected for specific infrastructure needs and are deposited into different accounts representing these requirements.

The Project would be designed and operated per applicable standards required by the City for new development with regard to public safety. The Project would be required to pay DIFs used to fund capital costs associated with constructing new public safety structures and purchasing equipment for new public safety structures. In addition, the City maintains mutual aid agreements with police agencies in the surrounding cities (e.g., Rancho Cucamonga, Ontario, Montclair, and Claremont) and with the San Bernardino County Sheriff's Department, which allow for the services of nearby police departments to assist the UPD during major emergencies. Payment of DIFs commensurate with the increased demand for services in the City would offset any increase in demand for police services.

Any future construction of new or expansion of existing police protection facilities would be subject to Project-level environmental review and Site-specific mitigation as appropriate in order to ensure significant environmental impacts are avoided or mitigated. However, the addition of 65 single-family residential structures represents approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households, which is a negligible amount of the future growth forecasts in the City. Therefore, the constructing of Project in accordance with local policies would not require new or physically altered police protection facilities, the additional construction of which could cause significant environmental impacts. Therefore, impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| c) Schools? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* The addition of 65 single-family residential structures is expected to generate an additional 189 residents in the City. This increase in population and households represents approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households, respectively, which is a negligible amount of the future growth forecasts in the City.

California Government Code (Section 65995[b]) establishes the base amount of allowable developer

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

fees imposed by school districts. These base amounts are commonly referred to as "Level 1 fees" and are subject to inflation adjustment every two years. School districts are placed into a specific "level" based on school impact fee amounts that are imposed on the development. With the adoption of Senate Bill 50 and Proposition 1A in 1998, schools meeting certain criteria can now adopt Level 2 and 3 developer fees. The amount of fees that can be charged over the Level 1 amount is determined by the district's total facilities needs and the availability of state matching funds. If there is state facility funding available, districts are able to charge fees equal to 50 percent of their total facility costs, termed "Level 2" fees. If, however, there are no State funds available, "Level 3" fees may be imposed for the full cost of their facility needs.[84]

Per California Government Code, "The payment or satisfaction of a fee, charge, or other requirement levied or imposed … are hereby deemed to be full and complete mitigation of the impacts … on the provision of adequate school facilities." The Project will be required to pay these development fees in accordance with Government Code 65995 and Education Code 17620. Through payment of development fees in accordance with Government Code 65995 and Education Code 17620, impacts associated with the provision of new or physically altered school facilities would be **less than significant**. No mitigation is required.

| | | | | |
|---|---|---|---|---|
| d) Parks? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* Refer to responses to Checklist Questions 3.3.16a and 3.3.16b. | | | | |
| e) Other public facilities? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* It is reasonable to conclude the payment of required fees, taxes, and other payments by the Applicant would sufficiently offset any incremental increase in demand for other governmental services. Any future construction of new or expansion of existing governmental facilities would be subject to Project-level environmental review and Site-specific mitigation as appropriate in order to ensure significant environmental impacts are avoided or mitigated.

The addition of 65 single-family residential structures is expected to generate an additional 189 residents in the City. This increase in population and households represents approximately 0.23 percent of the projected 2040 City population and 0.22 percent of the projected 2040 City households, respectively, which is a negligible amount of the future growth forecasts in the City. In the absence of any substantial increase in population, the construction of new or expansion of existing governmental facilities is not required. Impacts to other public facilities would be **less than significant** and no mitigation is required.

[84] *An Evaluation of the School Facility Fee Affordable Housing Assistance Programs*, Legislative Analyst's Office, January 2001. http://www.lao.ca.gov/2001/011701_school_facility_fee.html (accessed October 4, 2018).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.16 Recreation**<br>Would the Project: | | | | |
| a) Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact*. The Project includes provision of approximately 42,266 square feet (approximately one acre) of common area open space distributed throughout the community. A 0.75-acre recreational area is planned with a swimming pool, a pool house with restrooms, a children's play area, and barbeque and picnic areas. Four individual pocket parks totaling 9,526 square feet are planned for passive recreational use by residents. Additionally, the Project includes a private two-way street system with sidewalks on both sides of the street providing pedestrian connectivity throughout the Site. The Project Site is within walking and biking distance to existing recreational facilities including Sierra Vista Park located approximately 0.5 mile west of the Project Site and Upland Memorial Park is located approximately 0.8 mile south of the Project Site.<br><br>As detailed in response to Checklist Question 3.3.14a, the Proposed Project would not create a significant new increase in population that would utilize nearby recreational facilities such as Sierra Vista Park or Upland Memorial Park such that it would result in a substantial or accelerated physical deterioration of the facility. Implementation of the Proposed Project would include development of on-site recreation facilities and enhance neighborhood character. Any physical impacts resulting from development of the proposed on-site recreational facilities are addressed throughout this Initial Study and mitigated as necessary to levels below significance thresholds. Impacts would be **less than significant** and no additional mitigation is required. | | | | |
| **3.3.17 Transportation/Traffic**<br>Would the Project: | | | | |
| a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact*. The Project includes a private two-way street system with sidewalks on both sides of the street providing pedestrian connectivity throughout the Site. The proximity of the Site within walking and biking distance to existing recreational and commercial facilities helps to reduce automobile trips to and from the Project Site. The connection of the Project street and walkway system to 15th Street provides for on-street bicycle and pedestrian connectivity to 15th Street continuing bike and pedestrian access to commercial services located at North Campus Avenue and 19th Street approximately one mile to the north of the Site. The systems also provide | | | | |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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walking and biking access to Sierra Vista Park located approximately 0.5 mile west of the Project Site and/or Upland Memorial Park located approximately 0.8 mile south Site.

Omnitrans, a public transit agency serving the City and surrounding area, provides bus service in the Project area. To provide regional mass-transit service, Omnitrans Routes 66 and 86 include bus stops at the intersection of Alta Avenue and Foothill Boulevard approximately 0.75 mile south of the Project Site. Additionally, Omnitrans Route 83 includes bus stops at the intersection of Campus Avenue and 16th Street approximately 1.15 miles northwest of the Project Site.

Foothill Boulevard connects the Fontana Metrolink Transit Center to the Montclair Transit Center. The Project would not alter the location or frequency of Omnitrans or Metrolink transportation in the study area. The Project would adhere to applicable City standards that support and/or facilitate alternative modes of transportation. Through the City's project review process, policies, plans, and/or programs supporting alternative transportation would be reviewed and incorporated as applicable. Adherence to standard measures would ensure Project impacts related to this issue remain **less than significant**. No mitigation is required.

Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of levels of service (LOS), which are defined using the letter grades A through F. These levels recognize that, while an absolute limit exists as to the amount of traffic traveling through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute capacity. Under such conditions, congestion is experienced.

All study intersections are under the jurisdiction of the City of Upland, which uses LOS D as the minimum level of service standard for intersection operations. Therefore, study intersections in the City that operate at LOS E or F are required to be mitigated to LOS D or better.[85]

A Project-specific Traffic Impact Analysis (TIA) was prepared and included the following seven intersections as the Project study area for LOS analysis (Appendix I):

1. Campus Avenue & 14th Street;
2. Driveway 1 & 15th Street (Future Intersection);
3. Driveway 2 & 15th Street (Future Intersection);
4. Alta Avenue & 15th Street;
5. Alta Avenue & 14th Street;
6. Alta Avenue & Foothill Boulevard (State Route 66); and
7. Grove Avenue & Foothill Boulevard (State Route 66).

[85] LOS D delay in seconds is between >25 and ≤35 for unsignalized intersections and between >35 and ≤55 for signalized intersections. LOS E delay in seconds is between >35 and ≤50 for unsignalized intersections and between >55 and ≤80 for signalized intersections. LOS F delay in seconds is >50 for unsignalized intersections and >80 for signalized intersections.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Each of these intersections was analyzed for LOS under the following six scenarios:

- Existing 2018 Conditions;
- Existing with Project Conditions;
- Opening Year (2020) without Project Conditions;
- Opening Year (2020) with Project Conditions;
- Year 2040 without Project Conditions; and
- Year 2040 with Project Conditions.

For the purposes of analyzing traffic scenarios, the Project will be constructed in a single phase with an anticipated opening year of 2020. Trip generation rates are calculated using rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition) for Land Use 210 "Single Family Detached." The Proposed Project is anticipated to generate a net total of 623 trip-ends per day with 50 a.m. peak hour trips and 65 p.m. peak hour trips. The following analysis is based on the findings of the Project-specific TIA.

**Existing 2018 Without and With Project Conditions.** All study area intersections currently operate at satisfactory LOS under existing conditions and are forecast to continue to operate at satisfactory LOS under Existing with Project Conditions.[86] Additionally, there are no unsignalized study area intersections anticipated to warrant a traffic signal for Existing with Project Conditions. Therefore, no improvements are required.

**Opening Year (2020) Without and With Project Conditions.** A conservative 2 percent per year growth rate was applied to the Project study area.[87] All study area intersections under Opening Year (2020) Without Project Conditions would operate at satisfactory LOS and are forecast to continue to operate at satisfactory LOS under Opening Year (2020) With Project Conditions.[88] Additionally, there are no study area intersections anticipated to meet traffic signal warrants for Opening Year (2020) Without and With Project Conditions in addition to those previously warranted for Existing with Project Conditions. Furthermore, a queuing analysis was conducted for the intersection of Campus Avenue and 14th Street to determine if the left turn pocket storage is sufficient for all approaches and whether the current traffic signal phasing should be modified (currently permissive phasing). As demonstrated from the peak hour operations, the intersection of Campus Avenue and 14th Street is anticipated to operate at an acceptable LOS with the existing signal phasing.[89] Therefore, no improvements are required.

86 *Upland Colonies Traffic Impact Analysis.* Table 5-1. August 2018 (Appendix I).

87 According to SCAG, the City's change in population from 2012 to 2040 equates to roughly a 0.32 percent growth rate compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 11.58 percent, or 0.39 percent annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 37.22 percent, or a 1.14 percent annual growth rate. Therefore, implementing a 2 percent annual growth rate would likely overstate potential impacts identified in this analysis.

88 *Ibid.* Table 6-1.

89 *Ibid.* Table 6-2.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

**Year (2040) Without and With Project Conditions.** As detailed above, a conservative 2 percent per year growth rate was applied to the Project study area. All study area intersections under Year (2040) Without Project Conditions would operate at satisfactory LOS and are forecast to continue to operate at satisfactory LOS under Year (2040) With Project Conditions.[90] Additionally, there are no study area intersections anticipated to meet traffic signal warrants for Year (2040) Without and With Project Conditions in addition to those previously warranted for Existing with Project Conditions. Furthermore, a queuing analysis was conducted for the intersection of Campus Avenue and 14th Street to determine if the left turn pocket storage is sufficient for all approaches and whether the current traffic signal phasing should be modified (currently permissive phasing). As demonstrated from the peak hour operations, the intersection of Campus Avenue and 14th Street is anticipated to operate at an acceptable LOS with the existing signal phasing.[91] Therefore, no improvements are required.

With implementation of the Proposed Project, all study area intersections are forecast to operate at satisfactory LOS under all the scenarios specified above through the year 2040. Impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Would the project conflict or be inconsistent with *CEQA Guidelines* Section 15064.3 subdivision (b)? | ☐ | ☐ | ☐ | ☒ |

*No Impact. CEQA Guidelines* Section 15064.3, subdivision (b) establishes "vehicle miles traveled" (VMT) criteria in lieu of LOS for analyzing transportation impacts and was signed into law as SB 743 in 2013. Regulatory changes to the *CEQA Guidelines* that implement SB 743 were approved by the Office of Planning and Research on December 28, 2018. However, lead agencies have until July 1, 2020, which is the statewide implementation date, to opt-in use of the new VMT metric. The City has not yet developed a methodology for addressing potential VMT impacts. In cases where lead agencies use LOS for analyzing transportation impacts, they may continue to do so until July 1, 2020. As the City's General Plan identifies intersection thresholds of significance in accordance with LOS, and because the City has not yet developed or approved a methodology for addressing potential VMT impacts, *CEQA Guidelines* Section 15064.3, subdivision (b) does not apply to the proposed project.

| | | | | |
|---|---|---|---|---|
| c) Substantially increase hazards to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Access to the Project Site is proposed along 15th Street via a primary ingress/egress gate enhanced with streetscapes and an entry monument. A secondary access is proposed along the western end of the Project Site that will provide residential entry/exit and also facilitate entry/exit for emergency and public vehicles (e.g., trash service). Both access points are proposed to be gated, and all interior streets are proposed to be privately owned and maintained by a homeowner's association. Development of 65 single-family residential units on site is compatible with existing single-family residential uses to the west, south, and east, and multifamily residential units

[90] *Ibid.* Table 7-1.
[91] *Ibid.* Page 62.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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(duplexes) to the north.

The Project would be designed and operated per applicable standards required by the City for new development with regard to public safety. As detailed in the Site-specific Fire Master Plan, the Project Site includes a primary ingress/egress gate and a secondary access along the western end of the Project Site. All driveway entryways and curves will include adequate turn radii for residents and emergency response vehicles. Additionally, the Project-specific TIA concluded all study area intersections have adequate left turn pocket storage for all approaches, and the current permissive traffic signal phasing is adequate (Appendix I).

The design of all roadways must provide adequate sight distance and traffic control measures. This provision is normally realized through roadway design to facilitate roadway traffic flows. Roadway improvements in and around the Project Site would be designed and constructed to satisfy all City requirements for street widths, corner radii, intersection control, and would incorporate design standards tailored to Site access requirements. Adherence to applicable City requirements would ensure the proposed development would not include any sharp curves or dangerous intersections. Impacts would be **less than significant** and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| d) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* As stated in response to Checklist Question 3.3.9g, the Project would be designed and operated per applicable standards required by the City for new development with regard to public safety. Policy PFS-2.11 of the City's General Plan requires new development to be accessible to emergency vehicles and not impede the ability of service providers to provide adequate emergency response.[92] As detailed in the Site-specific Fire Master Plan, the Project Site includes a primary ingress/egress gate and a secondary access along the western end of the Project Site that will provide residential entry/exit and also facilitate entry/exit for emergency vehicles. All driveway entryways and curves will include adequate turn radii for residents and emergency response vehicles, and the Proposed Project will include a C10 fire alarm, a "Knox" key system at the perimeter gate, and an "Infrared Automatic Gate System" to ensure immediate fire department access to the Project Site in the event of an emergency in accordance with Policy PFS-2.11 (Emergency Vehicle Access) of the City's General Plan.

Additionally, General Plan Policy PFS-2.10 requires new development, including the Proposed Project, to incorporate evacuation routes in Project design,[93] which would be submitted to and approved by the SBCFD prior the issuance of building permits. Adherence to the emergency access measures required by the City would ensure a **less than significant impact** related to provision of adequate emergency access. No mitigation is required.

[92] *Chapter 7 Public Facilities and Services Element, City of Upland General Plan*, Page PFS-3, City of Upland, September 2015.
[93] *Ibid.*

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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### 3.3.18 Tribal Cultural Resources

Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a Site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

| | | | | |
|---|---|---|---|---|
| a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k). | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* Signed into law in September 2004, and effective March 1, 2005, Senate Bill 18 (SB 18) permits California Native American tribes recognized by the NAHC to hold conservation easements on terms mutually satisfactory to the tribe and the landowner. The term "California Native American tribe" is defined as "a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC." The bill requires a City or County to consult with California Native American tribes for the purpose of preserving specified places, features, and objects located prior to the adoption or amendment of a General Plan or Specific Plan. This bill requires the planning agency to refer to the California Native American tribes specified by the NAHC and to provide them with opportunities for involvement.

Chapter 532, Statutes of 2014 (i.e., Assembly Bill 52 or AB 52), requires Lead Agencies evaluate a Project's potential to impact "tribal cultural resources." Such resources include "[s]ites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are eligible for inclusion in the California Register of Historical Resources or included in a local register of historical resources." AB 52 also gives Lead Agencies the discretion to determine, supported by substantial evidence, whether a resource qualifies as a "tribal cultural resource."

CEQA defines a "historical resource" as a resource that meets one or more of the following criteria: (1) is listed in, or determined eligible for listing in, the California Register of Historical Resources (California Register); (2) is listed in a local register of historical resources as defined in PRC §5020.1(k); (3) is identified as significant in a historical resource survey meeting the requirements of PRC §5024.1(g); or (4) is determined to be a historical resource by a Project's Lead Agency (PRC §21084.1 and *State CEQA Guidelines* §15064.5[a]).

"Local register of historical resources" means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution.

Per SB 18 and AB 52 (specifically California Public Resources Code 21080.3.1), Native American consultation is required upon request by interested California Native American tribes that have previously requested that the City provide them with notice of such Projects. The City disseminated notices of the Proposed Project to interested California Native American tribes on August 23, 2018. To date, only the San Manuel Band of Mission Indians (SMBMI) has responded to the City's notification request(s). In its August 28, 2018, response letter, the SMBMI stated the Proposed

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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Project area exists just within Serrano ancestral territory and is of interest to the Tribe. Due to the nature and location of the Proposed Project, the SMBMI requested the Site-specific cultural resources assessment and geotechnical report. These reports have been provided to the tribe for review. At this time consultation has concluded. Based on the consultation, the following mitigation has been identified.

**TCR-1** The San Manuel Band of Mission Indians (SMBMI) shall be contacted, as detailed in **Mitigation Measure CUL-1**, of any pre-contact cultural resource discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with the SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on site.

**TCR-2** Any and all archaeological/cultural documents created as part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the Applicant and City for dissemination to the SMBMI. The City and/or Applicant shall, in good faith, consult with the SMBMI throughout the life of the Project.

Construction of the Project is not expected to cause a substantial adverse change to the significance of any historical resource. It is possible that previously unknown buried archaeological resources could be identified during Project construction. Therefore, **Mitigation Measure CUL-1** is proposed in the event that prehistoric or historic archaeological resources (e.g., bottles, foundations, refuse dumps, or artifacts) are unearthed during ground-disturbing activities to require the contractor to halt or redirect ground-disturbing activities away from the vicinity of the find until the find can be evaluated by a qualified archaeologist.

With implementation of **Mitigation Measures TCR-1** and **TCR-2**, the Proposed Project would have a **less than significant impact** on tribal cultural resources, as defined in Public Resources Code Section 21074.

| | | | | |
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| b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* CEQA defines a "historical resource" as a resource that meets one or more of the following criteria: (1) is listed in, or determined eligible for listing in, the California Register of Historical Resources (California Register); (2) is listed in a local

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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register of historical resources as defined in PRC §5020.1(k); (3) is identified as significant in a historical resource survey meeting the requirements of PRC §5024.1(g); or (4) is determined to be a historical resource by a Project's Lead Agency (PRC §21084.1 and *State CEQA Guidelines* §15064.5[a]).

A resource may be listed as a historical resource in the California Register if it meets any of the following National Register of Historic Places criteria as defined in PRC §5024.1(C):

A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

B. Is associated with the lives of persons important in our past.

C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

D. Has yielded, or may be likely to yield, information important in prehistory or history.

A "substantial adverse change" to a historical resource, according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired."

*CEQA Guidelines* do not preclude identification of historical resources as defined in Public Resources Code Sections 5020.1(j) or 5024.1. Pursuant to *State CEQA Guidelines* Section 15064.5[c][4], if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the Project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study, but they need not be considered further in the CEQA process.

As detailed in response to Checklist Question 3.3.18a, the City disseminated notices of the Proposed Project to interested California Native American tribes in August 2018.

Through consultation with interested tribe(s), **Mitigation Measures TCR-1** and **TCR-2** are proposed to reduce impacts to tribal cultural resources to less than significant levels.

As detailed in response to Checklist Questions 3.3.5a and 3.3.5b, implementation of the Proposed Project is not expected to cause a substantial adverse change to the significance of any historical resource. However, it is possible that buried historical resources or archaeological resources could be identified during Project construction. Therefore, **Mitigation Measure CUL-1** is proposed in the event that prehistoric or historic archaeological resources (e.g., bottles, foundations, refuse dumps, or artifacts) are unearthed during ground-disturbing activities to require the contractor to halt or redirect ground-disturbing activities away from the vicinity of the find until the find can be evaluated by a qualified archaeologist.

With implementation of **Mitigation Measures TCR-1** and **TCR-2**, as well as **CUL-1**, the Proposed Project would have a **less than significant impact** on a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, and as considered significant to interested

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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California Native American tribes.

### 3.3.19 Utilities and Service Systems

Would the Project:

| | | | | |
|---|---|---|---|---|
| a) Require or result in relocation or construction of new or expanded water or wastewater treatment facilities or storm water drainage, electrical, natural gas, or telecommunication facilities the construction or relocation of which could cause significant environmental effects? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated*.

**Water and Wastewater:** The Proposed Project would result in approximately 0.018 mgd[94] of wastewater based on a sewer generation rate of 270 gallons per day (gpd)/per single-family dwelling unit.[95] The Project would use approximately 0.11 percent[96] of the daily surplus capacity at RP-1. This is an incremental increase in demand for wastewater services. Therefore, the Project would not require the construction or expansion of wastewater treatment facilities. No significant impact would occur and no mitigation is required.

Domestic water for the City and Project Site is provided by the City of Upland and San Antonio Water Company (SAWCo). The majority of the City's water comes from Cucamonga, Six Basins, and Chino groundwater basins and imported surface water purchased from the Metropolitan Water District (MWD).[97] The City's 2015 Urban Water Management Plan (UWMP) estimated the City's water demand based on SCAG population data and General Plan land use designations at the time of the report.

The IEUA calculated the average gallons per capita per day (GPCD) consumption of water from all its retail member agencies, including the City of Upland and SAWCo, to be 160 GPCD.[98] Therefore, with 189 additional residents, the Proposed Project would demand approximately 30,240 GPCD, or 0.093 acre-feet of water per day (33.95 acre-feet per year). According to the City's 2015 UWMP, the City will have 21,694 acre-feet of water demand and 24,943 acre-feet of water supply in 2020 and 23,915 acre-feet of water demand and 25,083 acre-feet of water supply in 2035.[99] Therefore, it is expected that the City will have a water surplus of 3,249 acre-feet in 2020 and 1,168 acre-feet in 2035. Accordingly, an additional 33.95 acre-feet of water demand per year anticipated by the Proposed Project would be met by the City and IEUA and its retail agencies (e.g., SAWCo). Therefore, the Project would not result in the need to build new or expand existing water facilities. For water and wastewater facilities, a less than significant impact would occur.

[94] 65 houses × 270 gpd per house = 17,550 gpd ÷ 1,000,000 = 0.018 mgd

[95] *Public Service & Utility Correspondence, City of Upland General Plan Final Program EIR, Appendix H* Table 1: General Plan Growth Above Existing Conditions. City of Upland, September 2012.

[96] 0.018 mgd demand ÷ 16.5 mgd surplus × 100 = 0.11 percent.

[97] *Section 5.15 Water Supply, City of Upland General Plan Final Program EIR,* City of Upland, September 2015.

[98] *2015 Final Urban Water Management Plan, Inland Empire Utilities Agency.* Table 4-2: IEUA Regional Alliance GPCD Baseline and Targets (2010 Aggregate Approach). June 2016.

[99] *Ibid.* Table 2-3: IEUA Total Water Demands by Retail Agency (AF) and Table 3-2: IEUA Retail Agencies' Projected Water Supply (AF).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

**Storm Water Drainage:** The Project is proposed on an existing flood control channel (15th Street Basin) that would be reconfigured adjacent to the east of the Project Site. There is an existing 84-inch reinforced concrete pipe (RCP) storm drain that conveys runoff to the northwest corner of 15th Street Basin. There is an existing 48-inch RCP storm drain located 280 feet east of the Project Site boundary that outlets to the 15th Street Basin. A concrete gutter located approximately 70 feet west of the Project Site conveys runoff to the 15th Street Basin. A 84" RCP storm drain is used to dewater the 15th Street Basin. This RCP storm drain inlet is located approximately 200 feet northwest of the Fernando Avenue and 15th Street intersection. On-site runoff from the Project Site will be collected and conveyed by a proposed on-site storm drain system to the reconfigured 15th Street Basin, as detailed in the Project-specific Drainage Plan (Appendix G1) and described below.

The reconfigured 15th Street Basin will measure approximately 1,056 feet long by 120 feet wide with an approximately 21-foot depth below grade at the western end and a 7-foot depth below grade at the eastern end. A section of the existing 84-inch RCP storm drain line will be removed and a proposed 12-foot by 8-foot round catch basin (RCB) storm drain will extend the remaining 84-inch RCP storm drain easterly along the southern boundary of the Project Site to outlet into the reconfigured 15th Street Basin. The on-site runoff will be collected by grated inlets within each lot and two curb inlets and conveyed to the proposed 12-foot by 8-foot RCB. A section of the existing RCP storm drain will be removed and replaced with a proposed 84" RCP storm drain along the southern boundary of the Project Site that will parallel the proposed 12-foot by 8-foot RCB storm drain. The reconfigured 84" RCP storm drain will be used to dewater the reconfigured 15th Street Basin. A proposed 30-inch RCP storm drain line will convey runoff from an existing 48-inch RCP storm drain and flows from Drainage Area A. This proposed 30-inch RCP storm drain line will be constructed 260 feet east of the western Project Site boundary. The 30-inch RCP storm drain will connect to the proposed 12-foot by 8-foot RCB storm drain.

The existing basin would be retrofitted to accommodate a trapezoidal emergency spillway with a crest at an elevation of 1,426.6 feet amsl. The emergency spillway, having a base of 16 feet and a top width of 48.4 feet, would be installed at the end of Grove Avenue. Combined with the proposed box weir outlet system, potential impacts associated with Project development would be minimized. The box weir outlet system would be designed to pass through the 200- to 500-year storm, with the emergency spillway providing discharge capacity for larger events. As the box weir outlet system can accommodate flows well in excess of the 100-year storm event, it is unlikely flows over the emergency spillway would occur during foreseeable storm events.

Development of the Project Site would reduce the overall area of the existing basin, but the proposed modifications to the remaining portion of the 15th Street Basin would provide the required storage volume by increasing the depth of the ponding. In the existing condition, the basin ponds to an elevation of 1,422.6 feet during a 100-year storm event. In the proposed condition, the basin would pond to an elevation of approximately 1,426 feet.[100] This increased depth will provide 0.5 feet of freeboard between the emergency spillway crest and the 100-year water surface elevation. The emergency spillway shall be constructed for the 1,000-year event (1.35 × 100-year flow rate) in

[100] *15th Street Basin Modifications Review and Recommendations*. $Q_3$ Consulting. June 29, 2018, revised July 31, 2018 (Appendix G3).

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
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accordance with San Bernardino County Detention Basin Design Criteria, with the required freeboard to the top of the dam embankment to be above the 1,000-year water surface elevation. Using a 9-foot wide by 1.5-foot high opening, the maximum water surface elevation is projected to be 1,426.1 feet with a peak discharge of 246.7 cfs. This meets the peak discharge and maximum 100-year water surface elevation goals.

The approval of drainage features/improvements occurs through the building plan check process. As part of this process, all Project-related drainage features would be required to meet the City's Public Works Division and RWQCB standards. Through implementation of **Mitigation Measure HYD-3**, the Applicant shall prepare a Final WQMP to ensure storm water runoff would be infiltrated on site at volumes that would not exceed the pre-development condition by more than 5 percent and any storm water overflow from all three on-site DAs would outlet to the proposed 12-foot by 8-foot RCB storm drain, which will discharge into the reconfigured 15th Street Basin described above, which has been designed to satisfy required storage capacities. The periodic maintenance of any required modular wetland units and infiltration basin and landscaped areas during Project occupancy and operation shall be in accordance with the schedule outlined in the WQMP would ensure impacts remain less than significant.

**Other Utilities:** All proposed electric power, natural gas, and telecommunications facilities would be installed simultaneously with finish grading activities and required roadway frontage improvements for the Project site. As a result, interconnection to the existing utilities surrounding the site would not result in substantial disturbance of native habitat or soils, or existing roadways or utilities. There would be no significant environmental effects specifically related to the installation of utility interconnections that are not encompassed within the Project's construction and operational footprint, and therefore already identified, disclosed, and subject to all applicable mitigation measures, as well as local, State, and federal regulations, as part of this Initial Study.

The demand for water, wastewater, storm drainage and utility capacity would not result in the development of off-site features or facilities that would cause or contribute to an environmental impact; therefore, no mitigation is required.

| | | | | |
|---|---|---|---|---|
| b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple-dry year? | ☐ | ☐ | ☒ | ☐ |

*Less Than Significant Impact.* Due to the past drought conditions, the City's water department implemented the "High" stage of the Water Conservation Ordinance, which requires a 36 percent reduction in water usage.[101] The Project will be required to be consistent with the City's water reduction requirements pursuant to City Municipal Code Section 13.16.050, *Conservation program-High shortage stage.* The Project will be required to install water-reducing or water-saving toilets, showerheads, and other features and drought-tolerant landscaping.

[101] *Ibid.* IEUA 2015 Water use Efficiency Business Plan, Appendix F: Table 9: Retail Agency Emergency Regulation Mandatory Reduction %.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| As detailed in response to Checklist Question 3.3.19b, the Proposed Project would demand up to approximately 30,240 GPCD, or 0.093 acre-feet of water per day (33.95 acre-feet per year). According to the 2015 UWMP, the City will have 21,694 acre-feet of water demand and 24,943 acre-feet of water supply in 2020 and 23,915 acre-feet of water demand and 25,083 acre-feet of water supply in 2035.[102] Therefore, it is expected that the City will have a water surplus of 3,249 acre-feet in 2020 and 1,168 acre-feet in 2035. Accordingly, an additional 33.95 acre-feet of water demand per year anticipated by the Proposed Project would be met by the City and IEUA and its retail agencies (e.g., SAWCo). Through compliance with City Municipal Code Section 13.16.050, *Conservation program-High shortage stage,* the City has sufficient water supply to serve the Project from existing supplies and entitlements. Impacts would be **less than significant**. No mitigation is required. | | | | |
| c) Result in a determination by the wastewater treatment provider which serves or may serve the Project determined that it has adequate to serve the Project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* Please refer to response to Checklist Question 3.3.19a. | | | | |
| *d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?* | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact.* According to the City's General Plan EIR, solid waste in the City is transported primarily to the Mid-Valley Sanitary Landfill in Rialto. The Mid-Valley Sanitary Landfill has a daily permitted throughput of 7,500 tons per day, a remaining capacity of 67,520,000 cubic yards, and has an estimated closure date of 2033.[103] The Proposed Project would produce approximately 0.32 ton of solid waste a day.[104] The daily volume of solid waste expected to be generated by the Proposed Project represents 0.004 percent of the current permitted throughput at the Mid-Valley Sanitary Landfill.[105] As there is sufficient capacity, development of the Proposed Project would not significantly affect current operations or the expected lifetime of the landfills serving the project area. A **less than significant impact** would occur. Therefore, no mitigation is required. | | | | |
| e) Comply with federal, State, and local management and reduction statues and regulations related to solid waste? | ☐ | ☐ | ☒ | ☐ |
| *Less Than Significant Impact*. The City requires all development to adhere to all source reduction | | | | |

[102] *Ibid.* Table 2-3: IEUA Total Water Demands by Retail Agency (AF) and Table 3-2: IEUA Retail Agencies' Projected Water Supply (AF).

[103] Facility/Site Summary Details: Mid-Valley Sanitary Landfill (36-AA-0055). CalRecycle. Website: https://www2.calrecycle.ca.gov/swfacilities/Directory/36-AA-0055/ (accessed October 8, 2019).

[104] Section 5.21 Solid Waste. *City of Upland General Plan Final Program EIR.* September 2015. (3.4 lbs./resident/day × 189 residents = 642.6 lbs./day ÷ 2,000 lbs. = 0.32 ton/day.

[105] 0.32 ton/day ÷ 7,500 tons/day × 100 = 0.004 percent.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| programs set forth in the Source Reduction and Recycling Element (SRRE) for the disposal of solid waste, including yard waste.[106] The Project would adhere to the SRRE and, like all development, also comply with all other applicable local, State, and federal solid waste disposal standards. Impacts are considered **less than significant** and no mitigation is required. | | | | |
| **3.3.20 Wildfire**<br>Would the Project: | | | | |
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | ☒ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ☐ | ☐ | ☒ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ☐ | ☒ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☐ | ☒ |
| *No Impact*. The project site is surrounded entirely by urban uses and is not located within a Very High Fire Hazard Severity zone within a Local or State Responsibility Area;[107] therefore, discussion of these issues is not relevant to the project site. Design and construction of the project in accordance with the 2016 CBC, which includes design features such as ignition-resistant materials and incorporation of fire sprinklers (as required) will reduce the risk of exposure of persons or property to fire hazards. **No impact** related to this issue would occur and no mitigation is required. | | | | |

[106] Section *5.21 Solid Waste, City of Upland General Plan Final Program EIR,* City of Upland, September 2015.
[107] Figure SAF-3, Upland General Plan.

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **3.3.21 Mandatory Findings of Significance** | | | | |
| a) Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, rare or threatened plant or animal, or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated*. No endangered or threatened species were identified on Site. As stated in response to the checklist questions outlined in Section 3.3.4 (Biological Resources) of this Initial Study, no special-status species were observed on the Project Site during a pedestrian survey conducted as part of the Biological Resources Assessment. Potential impacts to the burrowing owl and to migratory and nesting bird species would be mitigated to a less than significant level with adherence to **Mitigation Measure BIO-1**. Impacts to on-site biological resources will be reduced to a **less than significant** level with adherence to the identified mitigation measures.<br><br>Development of the Proposed Project would not result in the elimination of any identified archaeological or historical resource. It is possible that unknown buried historical, archaeological, or paleontological resources could be identified during Project construction. **Mitigation Measures CUL-1, GEO-1**, as well as **Mitigation Measures TCR-1** and **TCR-2**, have been identified to address potential impacts if subsurface historical, archaeological, and/or paleontological resources are encountered during construction operations. Adherence to these measures would reduce potential impacts to a **less than significant** level. | | | | |
| b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.) | ☐ | ☒ | ☐ | ☐ |
| *Potentially Significant Impact Unless Mitigation Incorporated*. The Proposed Project has either no impact, a less than significant impact, or a less than significant impact with mitigation incorporated with respect to all environmental issues pursuant to CEQA. Due to the limited scope of direct physical impacts to the environment associated with the Proposed Project, the Project's impacts are primarily Project-specific in nature.<br><br>As detailed in response to Checklist Question 3.3.3a, the SCAQMD developed the operational | | | | |

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

thresholds of significance based on the level above which a Project's individual emissions would result in a cumulatively considerable contribution to the Basin's existing air quality conditions. Project-related emissions would not exceed the established SCAQMD daily emission thresholds for any criteria pollutants. Without any exceedance in air quality emissions thresholds, the Proposed Project would not result in a cumulatively considerable contribution to significant air quality impacts.

Short-term construction-related noise impacts that would result from construction of the proposed mixed uses would remain less than significant with implementation of Standard Conditions N-1 and N-2 identified in this Initial Study. Standard Condition N-1 limits construction activity between the hours of 7:00 a.m. and 6:00 p.m. on weekdays pursuant to Section 9.40.100(M) of the City's Municipal Code. Standard Condition N-2 establishes best management practices for operation and staging of construction equipment in accordance with manufacturers' standards and recommendations for noise attenuation.

Use of large mobile equipment such as a large bulldozer (greater than 80,000 pounds), loaded rucks, and jackhammers in proximity to sensitive receptor R5 would exceed the FTA threshold of 80 VdB for sensitive land uses. With implementation of **Mitigation Measure NOI-1** during construction, vibration levels at the nearest sensitive receptors (receiver location R5) would be reduced to between 49 VdB and 78 VdB, reducing vibration-related impacts to less than significant levels.

As detailed in response to Checklist Question 3.3.17a, all study area intersections currently operate at satisfactory LOS under existing conditions and are forecast to continue to operate at satisfactory LOS without the Proposed Project under all the Project scenarios.

The Proposed Project may incrementally increase the demand for water and wastewater treatment and storage. As detailed in response to Checklist Question 3.3.19d, the Proposed Project would demand approximately 30,240 GPCD, or 0.093 acre-feet of water per day (33.95 acre-feet per year). According to the City's 2015 UWMP, the City will have 21,694 acre-feet of water demand and 24,943 acre-feet of water supply in 2020 and 23,915 acre-feet of water demand and 25,083 acre-feet of water supply in 2035. Therefore, it is expected that the City will have a water surplus of 3,249 acre-feet in 2020 and 1,168 acre-feet in 2035. Accordingly, an additional 33.95 acre-feet of water demand per year anticipated by the Proposed Project would be met by the City and IEUA and its retail agencies (e.g., SAWCo). As stated in response to Checklist Question 3.3.19a, the Proposed Project is anticipated to generate 17,550 gallons of wastewater per day, which is approximately 0.11 percent of the available daily surplus treatment capacity at RP-1. Therefore, the increased wastewater flows from the Proposed Project can be accommodated within the existing design capacity of RP-1, would be typical of wastewater flows in the City, and would not contribute to an exceedance of the RP-1 treatment capacity.

As required for a development of this type, the Proposed Project is subject to interconnection fees imposed by the City in order to offset increased demand for water and wastewater treatment and storage. The City shall ensure provision of water and wastewater supplies and infrastructure to support existing development and future growth through maintenance and expansion, when necessary, through consultation with SAWCo and County agencies while minimizing environmental

| | Potentially Significant Impact | Potentially Significant Impact Unless Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|

impacts. Any future construction or expansion of water and/or wastewater facilities would require Project-level environmental review and Site-specific mitigation as appropriate in order to ensure significant environmental impacts are avoided or mitigated.

Other development projects would mitigate their incremental impacts on the environment to the extent feasible. With the implementation of Project-specific mitigation, all of the Project's impacts would be mitigated to less than significant levels; therefore, the Proposed Project's contribution to significant cumulative impacts would be **less than significant.**

| | | | | |
|---|---|---|---|---|
| c) Does the Project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

*Potentially Significant Impact Unless Mitigation Incorporated.* Tables 3.3.3e through 3.3.3f demonstrate that, with compliance with applicable regulatory policy designed to reduce emissions, and **Mitigation Measure AQ-1,** all Project construction-source and operational emissions will be **reduced to less than significant levels.**

Like all of Southern California, the Project Site could be subject to strong ground shaking resulting from large earthquakes. Adherence to the latest CBC standards, as amended, as well as implementation of Standard Condition G-1 (compliance with the current edition of the CBC and the recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation) would ensure potential Project-related geologic and soil conditions impacts remain **less than significant.**

Although potential drainage and water quality impacts could result from the Proposed Project, implementation of NPDES permits and the development/implementation of the Project-specific SWPPP and WQMP required in **Mitigation Measures HYD-2** and **HYD-3**, would reduce potential impacts to a less than significant level. The Project's drainage system, including the modification of the remaining portions of the basin, is designed to maintain current levels of drainage and flood control capacity. Potential impacts related to the modification of the Site's existing drainage pattern have been reduced to **less than significant with implementation of mitigation.**

Construction and operation of the Proposed Project has the potential to expose persons to noise levels in excess of standards in the local General Plan and Noise Ordinance. Implementation of **Mitigation Measure NOI-1** ensures large loaded trucks, mobile equipment greater than or equal to 80,000 pounds, and jackhammers shall not be used within 50 feet of the nearest sensitive receptor. With implementation of **Standard Conditions N-1** and **N-2** and **Mitigation Measure NOI-1**, short-term construction and vibration impacts to nearby sensitive receptors will remain **less than significant**.

The Proposed Project will contribute traffic to local roadways and intersections. The Project-specific TIA determined Project-related traffic on local roadways and intersections will **be less than significant.** Through implementation of **Standard Conditions G-1**, and **Mitigation Measures HYD-1** through **HYD-3**, and **NOI-1,** Project-related environmental effects that could cause substantial adverse effects on human beings, either directly or indirectly, would be **less than significant.**

# 4.0 REFERENCES

California Department of Conservation Farmland Mapping and Monitoring Program. San Bernardino County Important Farmland 2016, Sheet 2 of 2. http://www.conservation.ca.gov/dlrp/fmmp/Pages/SanBernardino.aspx (accessed July 23, 2018).

California Department of Toxic Substances Control. EnviroStor Database. https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=upland+memorial+park (accessed June 14, 2018).

_____. Hazardous Waste and Substances Site List (Cortese). https://www.envirostor.dtsc.ca.gov/public/search?cmd=search&reporttype=CORTESE&Site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM,COLUR&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST+(CORTESE) (accessed June 14, 2018).

CalRecycle. Facility/Site Summary Details: Mid-Valley Sanitary Landfill (36-AA-0055), http://www.calrecycle.ca.gov/SWFacilities/Directory/36-AA-0055/Detail (accessed on August 1, 2018).

City of Upland. General Plan Final Program Environmental Impact Report, City of Upland, September 2015.

_____. General Plan Housing Element, 2013–2021. Table 4-1: Upland Regional Housing Needs Allocation, 2013-2021. Housing Element Adopted January 27, 2014.

_____. City of Upland Climate Action Plan. September 2015.

_____. City of Upland Final Program EIR, Section 5.16 Wastewater, Page 5.16-3. September 2015.

_____. Cable Airport Land Use Compatibility Plan. Map 3A, Compatibility Policy Map. 2014.

Frontier Communities. *Villa Serena Specific Plan.* June 2019.

GeoTek, Inc., Geotechnical and Infiltration Evaluation for Proposed Single-Family Residential Development, Assessor's Parcel Numbers (APNs) 1045-121-02 & 1045-151-34, Upland Colonies 59, North of East 15th Street, Upland, San Bernardino County, California. Page 5. July 2018.

_____. Phase I Environmental Site Assessment Assessor's Parcel Numbers (APNs) 1045-121-02 and 1045-151-34, Upland, San Bernardino County, California, June 27, 2018.

_____. Slope Stability Evaluation – New Basin, Tentative Tract 20245, Upland, San Bernardino County, California. September 16, 2019.

Inland Empire Utilities Agency. 2015 Final Urban Water Management Plan, June 2016.

Legislative Analyst's Office. An Evaluation of the School Facility Fee Affordable Housing Assistance Programs. January 2001. http://www.lao.ca.gov/2001/011701_school_facility_fee.html (accessed October 4, 2018).

Madole & Associates, Inc. Drainage Study in the City of Upland for the 15th Street Basin. June 12, 2017.

National Flood Insurance Program. Flood Insurance Rate Map No. 06071C8607H. Panel 8607H. Revised August 28, 2008.

Proactive Engineering Consultants, Inc. Water Quality Management Plan for Tract Number 20245. Form 4.3-2.

Q3 Consulting. 15th Street Basin Modifications Review and Recommendations. June 29, 2018, Revised July 31, 2018.

_____. 15th Street Basin Modifications – Spillway and Bypass Alternatives. September 10, 2019.

RCA Associates, Inc., General Biological Resources Assessment, Upland Colonies 59, Upland, San Bernardino County, California, updated August 30, 2018.

_____. Phase 1 Cultural Resources Assessment, July 13, 2018.

San Bernardino County. Inland Empire Utility Agency. Issuance of Waste Discharge and Producer/ User Reclamation Requirements for the Inland Empire Utilities Agency's Regional Water Recycling Facilities, Surface Water Discharges and Recycled Water Use, Order No. R8-2009-0021, NPDES No. CA8000409, https://18x37n2ovtbb3434n48jhbs1-wpengine.netdna-ssl.com/wp-content/uploads/2014/09/Consolidated-NPDES-Permit-Order-No.-R8-2009-0021.pdf (accessed October 5, 2018).

South Coast Air Quality Management District. Final 2012 Air Quality Management Plan, February 2013.

_____. Final 2016 Air Quality Management Plan. March 2016.

Southern California Association of Governments. Final 2016–2040 Regional Transportation Plan/ Sustainable Communities Strategy. Table 11 in Demographics & Growth Forecast Appendix. Adopted April, 2016.

_____. Local Profiles Report 2017. Profile of the City of Upland. Page 3. May 2017.

State of California Department of Conservation Mineral Land Classification Map, Aggregate Resources Only, Claremont-Upland P-C Region. Ontario Quadrangle, Special Report 143 Plate 6.8. 1984.

State of California Department of Finance. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011–2018 with 2010 Census Benchmark. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/ (accessed September 27, 2018).

State of California Mining and Geology Board. Guidelines for Classification and Designation of Mineral Lands, Department of Conservation Page 4. http://www.conservation.ca.gov/smgb/guidelines/documents/classdesig.pdf (accessed July 30, 2018).

State Water Resources Control Board. GeoTracker Database. https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=upland+memorial+park (accessed June 14, 2018).

United States Department of Agriculture, Natural Resources Conservation Service. Web Soil Survey, https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx (Accessed October 1, 2018).

Urban Crossroads. Upland Colonies Air Quality Impact Analysis, City of Upland. August 2018.

_____. Upland Colonies Greenhouse Gas Analysis, City of Upland. August 2018.

_____. Upland Colonies Noise Impact Analysis. Page 33. July 20, 2018.

_____. Upland Colonies Traffic Impact Analysis, City of Upland, June 6, 2018.

_____. Upland Colonies (Villa Serena) Traffic Impact Analysis Response to Comments, June 6, 2019.

# 5.0 SUMMARY OF MITIGATION MEASURES AND STANDARD CONDITIONS

## 5.1 AIR QUALITY

**AQ-1** Prior to issuance of grading permits and/or construction permits, the Applicant shall provide to the City verification that all off-road diesel construction equipment greater than 150 horsepower (>150 HP) to be used for the Project shall comply with the Environmental Protection Agency (EPA)/California Air Resources Board (CARB) Tier 3 emissions standards during all construction phases. During construction, the City shall ensure that all construction equipment be tuned and maintained in accordance with the manufacturer's specifications. This measure shall be implemented to the satisfaction of the City Planning Division.

## 5.2 BIOLOGICAL RESOURCES

**BIO-1** A burrowing owl and nesting bird pre-construction clearance survey shall be conducted within three days prior to ground-disturbing activities. The survey shall encompass the entire area of Project-related ground disturbance. If no active avian nests and no burrowing owls are found during the clearance survey, no additional mitigation will be required.

If a special-status species is located during the survey, consultation with the local California Department of Fish and Wildlife (CDFW) representative shall occur to determine what avoidance actions are required. If an active avian nest is discovered during the pre-construction clearance survey, construction activities shall be redirected around the nest(s). As determined by the City Planning Division, a qualified biologist shall delineate the boundaries of any such buffer area. The buffer shall be sufficient to ensure that nesting behavior is not adversely affected by the construction activity. For listed and raptor species, this buffer may be expanded to up to 500 feet from the active nest at the discretion of the qualified biologist in consultation with the City Planning Division and CDFW.

The biologist shall have the authority to temporarily halt construction if it occurs within an established avian buffer or if new nesting activity occurs and a new buffer is required. Encroachment into buffers around active nests must be conducted only at the discretion of the biologist. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, construction activities within the buffer area may occur or resume at the discretion of the qualified biologist in consultation with the City Planning Division and CDFW. Upon completion of construction monitoring, the biologist shall prepare a report of findings documenting the results of the recommended protective measures described above to document compliance with applicable State and federal laws pertaining to the protection of nesting birds. This measure shall be implemented to the satisfaction of the City Planning Division.

## 5.3 CULTURAL RESOURCES

**CUL-1** In the event that pre-contact cultural resources are discovered during project activities, all work in the immediate vicinity of the of the find (within a 100-foot buffer) shall cease and a qualified archaeologist meeting Secretary of the Interior standards shall be hired to assess

the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resource Department (SMBMI) shall be contacted as detailed within **Mitigation Measure TCR-1**, if any such find occurs and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regard to significance and treatment.

If significant Native American historical resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to the SMBMI for review and comment, as detailed in **Mitigation Measure TCR-1**. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code Section 7050.5 and that code enforced for the duration of the project.

## 5.4 GEOLOGY AND SOILS

**Standard Condition G-1:** Prior to the approval of grading and/or building permits, the Applicant shall provide evidence to the City for review and approval that on-site structures, features, and facilities have been designed and will be constructed in conformance with applicable provisions of the most current edition of the CBC at the time of construction and the recommendations cited in Section 5 of the Project-specific Geotechnical and Infiltration Evaluation. Geotechnical recommendations include, but are not limited to, remedial earthwork and/or ground improvement to provide a sufficient layer of engineered fill or densified soil beneath the structural footings/foundations, as well as proper surface drainage devices and erosion control. Verification testing must be performed upon completion of ground improvements to confirm that the compressible soils have been sufficiently densified. This condition shall be implemented to the satisfaction of the City Building and Safety Division.

**GEO-1** Prior to the issuance of grading permits, the maximum depth of ground-disturbing activities shall be provided to the City. If ground disturbance in excess of 15 feet is required, the Applicant shall provide evidence to the City that a qualified paleontologist has been retained. Upon review of Project materials, the qualified paleontologist shall identify those areas of the Site that require monitoring.

In the event that paleontological resources are unearthed during ground-disturbing activities, the qualified paleontologist shall halt or redirect ground-disturbing activities away from the vicinity of the find so that the find can be evaluated by a qualified paleontologist. A buffer area shall be established around the find within which construction activities shall not be allowed to continue. The buffer area parameters will be determined by the Project paleontologist in consultation with the City and Project proponent, but shall not be less than

100 feet. Work shall be allowed to continue outside the buffer area. The paleontologist shall determine the need for paleontological construction monitoring in the vicinity of the find thereafter.

All paleontological resources unearthed by Project construction activities shall be evaluated by a qualified paleontologist. At the paleontologist's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock samples for initial processing and evaluation of the find. The Project proponent shall coordinate with the paleontologist and the City to develop an appropriate treatment plan for the resources. Preservation in place (i.e., avoidance) shall be considered the preferred treatment measure. If preservation in place is not feasible, treatment may include the implementation of paleontological data recovery/salvage excavations to remove the resource from the Project Site along with subsequent laboratory processing and analysis of the fossil specimens.

Any fossils encountered and recovered shall be prepared to the point of identification and catalogued before they are donated for final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the San Bernardino County Museum, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, and photographs shall also be filed at the repository and/or school.

Following the completion of the above measures, the paleontologist shall prepare a report summarizing the results of the monitoring and salvaging efforts, the methodology used in these efforts, as well as a description of the fossils collected and their significance. The report shall be submitted by the Project proponent to the City, the San Bernardino County Museum, the Natural History Museum of Los Angeles County, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the Project and required mitigation measures. This measure shall be implemented to the satisfaction of the City Planning Division.

## 5.5 HYDROLOGY AND WATER QUALITY

**HYD-1** Prior to the issuance of a grading permit, the Applicant shall file and obtain a Notice of Intent (NOI) with the Regional Water Quality Control Board (RWQCB) in order to be in compliance with the National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit for discharge of surface runoff associated with construction activities. Evidence that this NOI has been obtained (i.e., a copy of the Waste Discharger's Identification Number) shall be submitted to the City for coverage under the NPDES General Construction Permit. The NOI shall address the potential for an extended and discontinuous construction period based on funding availability. This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

**HYD-2** Prior to the issuance of a grading permit, the Applicant shall submit to and receive approval from the City of Upland of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP

shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire demolition, grading, and construction period. In addition, the SWPPP shall emphasize structural and nonstructural Best Management Practices (BMPs) to control sediment and non-visible discharges from the Site. The SWPPP will include inspection forms for routine monitoring of the Site during demolition and construction phase to ensure National Pollutant Discharge Elimination System (NPDES) compliance. The SWPPP will be kept on site for the duration of Project demolition and construction and will be available to the local Regional Water Quality Control Board (RWQCB) for inspection at any time. Project BMPs may include (but shall not be limited to) the following:

- Sediment discharges from the Site may be controlled by the following: sandbags, silt fences, straw wattles and temporary basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction and repairs will be made when necessary as required by the SWPPP.
- Materials that have the potential to contribute to non-visible pollutants to storm water must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.
- All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the Site. Stockpiles will be surrounded by silt fences and covered with plastic tarps.
- In addition, the construction contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sandbag barriers and other sediment control measures called for in the SWPPP. Monthly reports and inspection logs shall be maintained by the contractor and reviewed by the City of Upland and the representatives of the State Water Resources Control Board. In the event that it is not feasible to implement specific BMPs, the City of Upland can make a determination that other BMPs will provide equivalent or superior treatment either on or off Site.

This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

**HYD-3** Prior to the issuance of a grading permit, the Applicant shall submit a Final Water Quality Management Plan (WQMP) to the City of Upland for review and approval. Prior to grading permit approval, the Project shall provide evidence that the Project design features identified in the Final WQMP have been fully incorporated into the Project plans. In accordance with the *Technical Guidance Document for Water Quality Management Plans* prepared for the County of San Bernardino Areawide Stormwater Program, National Pollutant Discharge Elimination System Permit Number CAS618036, Order Number R8-2010-0036, the Final WQMP shall confirm performance standard calculations for each of the Project Site's drainage areas. Specifically, the Final WQMP shall detail low impact development (LID) best management practices (BMPs) designed to retain the Project Site's minimum storm water treatment capacity and design capture volume to ensure post-

development storm water runoff volume or time of concentration for the 2-year frequency storm shall not exceed that of the pre-development condition by more than five percent. The proposed LID BMPs specified in the Final WQMP shall be incorporated into the grading and development plans submitted to the City for review and approval. Periodic maintenance of any required BMPs, including landscaped areas, during Project occupancy and operation shall be in accordance with the schedule outlined in the WQMP. This measure shall be implemented to the satisfaction of the City Public Works Department and Planning Division as appropriate.

## 5.6 NOISE

**Standard Condition N-1:** Construction activities occurring as part of the Project shall be subject to the limitations and requirements of Section 9.40.100(M) of the City Municipal Code, which states that construction activities may occur between 7:00 a.m. and 6:00 p.m., Mondays through Fridays. No construction activities shall be permitted outside of these hours or on Saturdays, Sundays, and City holidays except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days while the emergency continues, and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be impaired by the erection, demolition, alteration or repair of any building or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he or she shall further determine that loss or inconvenience would result to any party in interest, he or she may grant permission for such work to be done between the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work. This standard shall be implemented to the satisfaction of the City Building and Safety Division.

**Standard Condition N-2:** Prior to issuance of grading permits, the Applicant shall incorporate the following standards as notes on the grading plan cover sheet to minimize construction noise:

- Install sound dampening mats or blankets to the engine compartments of large mobile equipment (greater than or equal to 80,000 pounds) which are capable of a minimum 5 A-weighted decibels (dBA) noise reduction. The dampening materials must be capable of the minimum 5 dBA noise reduction and can be made of commercially-available sound dampening materials, including but not limited to polyurethane foam and vinyl sheeting.
- Project construction activities shall comply with the City of Upland Municipal Code requirements.

- Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project Site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project Site during all Project construction (i.e., to the northern center).
- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

This standard shall be implemented to the satisfaction of the City Building and Safety Division.

**NOI-1** Prior to issuance of grading permits, the Project proponent shall provide evidence to the City that large loaded trucks, mobile equipment greater than or equal to 80,000 pounds, and jackhammers shall not be used within 50 feet of receiver location R5 (the existing residential outdoor living areas adjacent to the western Project Site boundaries) if occupied at the time of Project construction. During construction activities, smaller, rubber-tired mobile equipment (less than 80,000 pounds) or equivalent alternative equipment shall be used within this area during Project construction to reduce vibration effects. This measure shall be implemented to the satisfaction of the City Building and Safety Division.

## 5.7 TRIBAL CULTURAL RESOURCES

**TCR-1** The San Manuel Band of Mission Indians (SMBMI) shall be contacted, as detailed in **Mitigation Measure CUL-1**, of any pre-contact cultural resource discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regard to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with the SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on-site.

**TCR-2** Any and all archaeological/cultural documents created as part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the Applicant and City for dissemination to the SMBMI. The City and/or Applicant shall, in good faith, consult with the SMBMI throughout the life of the Project.

# APPENDIX A:

# AIR QUALITY IMPACT ANALYSIS

# Upland Colonies

## AIR QUALITY IMPACT ANALYSIS

### CITY OF UPLAND

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AUGUST 1, 2018

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| µg/m$^3$ | Microgram per Cubic Meter |
| AADT | Annual Average Daily Trips |
| AQIA | Air Quality Impact Analysis |
| AQMD | Air Quality Management District |
| AQMP | Air Quality Management Plan |
| ARB | California Air Resources Board |
| BACM | Best Available Control Measures |
| CAA | Federal Clean Air Act |
| CAAQS | California Ambient Air Quality Standards |
| CalEEMod | California Emissions Estimator Model |
| Caltrans | California Department of Transportation |
| CAPCOA | California Air Pollution Control Officers Association |
| CARB | California Air Resources Board |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| DPM | Diesel Particulate Matter |
| EPA | Environmental Protection Agency |
| LST | Localized Significance Threshold |
| NAAQS | National Ambient Air Quality Standards |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Oxides of Nitrogen |
| Pb | Lead |
| $PM_{10}$ | Particulate Matter 10 microns in diameter or less |
| $PM_{2.5}$ | Particulate Matter 2.5 microns in diameter or less |
| PPM | Parts Per Million |
| Project | Upland Colonies |
| ROG | Reactive Organic Gases |
| SCAB | South Coast Air Basin |
| SCAQMD | South Coast Air Quality Management District |
| SIPs | State Implementation Plans |
| SRA | Source Receptor Area |
| TAC | Toxic Air Contaminant |
| TIA | Traffic Impact Analysis |

| | |
|---|---|
| TOG | Total Organic Gases |
| VMT | Vehicle Miles Traveled |
| VOC | Volatile Organic Compounds |
| VPH | Vehicles Per Hour |

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# EXECUTIVE SUMMARY

## CONSTRUCTION-SOURCE EMISSIONS

*REGIONAL IMPACTS*

For regional emissions, the Project has the potential to exceed the numerical thresholds of significance established by the South Coast Air Quality Management District (SCAQMD) for emissions of Oxides of Nitrogen ($NO_x$). Mitigation measure MM AQ-1 is recommended to reduce the impacts to less than significant levels. After implementation of the applicable MM, construction activity emissions will not exceed the numerical thresholds established by the SCAQMD for any criteria pollutants. Thus, a less than significant impact will occur.

*LOCALIZED IMPACTS*

For localized emissions, the Project would not exceed the SCAQMD's localized significance threshold. Thus, a less than significant impact would occur and no mitigation is required.

Project construction-source emissions would not conflict with the applicable Air Quality Management Plan (AQMP).

*Odors*

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less-than-significant.

## OPERATIONAL-SOURCE EMISSIONS

*REGIONAL IMPACTS*

For regional emissions, the Project net increase from the existing use would not exceed the regional thresholds of significance established by the SCAQMD for any criteria pollutant. Thus a less than significant impact would occur for Project-related operational-source emissions and no new impacts would occur.

*LOCALIZED IMPACTS*

Project operational-source emissions would not result in or cause a significant localized air quality impact as discussed in the operational LSTs section of this report. The proposed Project would not result in a significant CO "hotspot" as a result of Project related traffic during ongoing operations.

Project operational-source emissions would not conflict with the applicable AQMP.

*ODORS*

Substantial odor-generating sources include land uses such as agricultural activities, feedlots, wastewater treatment facilities, landfills or various heavy industrial uses. The Project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the Project would include disposal of miscellaneous residential refuse. Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances (1). Consistent with County requirements, all Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations. Potential operational-source odor impacts are therefore considered less-than-significant.

The results of this *Upland Colonies Air Quality Impact Analysis* are summarized in Table ES-1 below:

**TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS**

| Analysis | Report Section | Significance Findings | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| Regional Construction Emissions | 3.4 | *Less Than Significant* | *n/a* |
| Regional Operational Emissions | 3.5 | *Less Than Significant* | *n/a* |
| Localized Construction Emissions | 3.6 | *Potentially Significant* | *Less Than Significant* |
| Localized Operational Emissions | 3.7 | *Less Than Significant* | *n/a* |
| CO "Hot Spot" Analysis | 3.8 | *Less Than Significant* | *n/a* |
| Air Quality Management Plan | 3.9 | *Potentially Significant* | *Less Than Significant* |
| Sensitive Receptors | 3.10 | *Less Than Significant* | *n/a* |
| Odors | 3.11 | *Less Than Significant* | *n/a* |
| Cumulative Impacts | 3.12 | *Less Than Significant* | *n/a* |

# 1 INTRODUCTION

This report presents the results of the air quality impact analysis (AQIA) prepared by Urban Crossroads, Inc., for Upland Colonies (referred to as "Project").

The purpose of this AQIA is to evaluate the potential impacts to air quality associated with construction and operation of the proposed Project and recommend measures to mitigate impacts considered potentially significant in comparison to established air district thresholds.

## 1.1 SITE LOCATION

The proposed Upland Colonies site is located on the north side of 15th Street in the City of Upland as shown on Exhibit 1-A. The Project site is currently vacant. Land uses surrounding the Project site include a golf course to the north and residential homes to the south, west, and east. The Interstate 210 (I-210) freeway right-of-way is located roughly 1 mile north of the Project site.

## 1.2 PROJECT DESCRIPTION

Consistent with the *Upland Colonies Traffic Impact Analysis*, the Project is assumed to be developed within a single phase with an anticipated Opening Year of 2020 (2). Exhibit 1-B identifies the preliminary site plan. The Project is to include the development of 66 single family detached residential dwelling units.

## 1.3 STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES (BACMS)

Measures listed below (or equivalent language) shall appear on all Project grading plans, construction specifications and bid documents, and the City shall ensure such language is incorporated prior to issuance of any development permits.

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings) (3); Rule 431.2 (Low Sulfur Fuel) (4); Rule 403 (Fugitive Dust) (5); and Rule 1186 / 1186.1 (Street Sweepers) (6). It should be noted that BACMs are not mitigation as they are standard regulatory requirements.

**BACM AQ-1**

All applicable measures shall be incorporated into Project plans and specifications as implementation of Rule 403, which include but are not limited to (7):

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three (3) times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are reduced to 15 miles per hour or less.

## EXHIBIT 1-A: LOCATION MAP



**EXHIBIT 1-B: SITE PLAN**



**BACM AQ-2**

The following measures shall be incorporated into Project plans and specifications as implementation of Rule 1113 (8):

- Only "Low-Volatile Organic Compounds" paints (no more than 50 gram/liter of VOC) and/or High Pressure Low Volume (HPLV) applications consistent with South Coast Air Quality Management District Rule 1113 shall be used.

## 1.4 CONSTRUCTION-SOURCE MITIGATION MEASURES

**MM AQ-1**

For construction equipment greater than 150 horsepower (>150 HP), the Construction Contractor shall use off-road diesel construction equipment that complies with EPA/CARB Tier 3 emissions standards during all construction phases and will ensure that all construction equipment be tuned and maintained in accordance with the manufacturer's specifications.

## 1.5 OPERATIONAL-SOURCE MITIGATION MEASURES

Project operational-source emissions will be less than significant. Therefore, no mitigation measures are required.

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# 2 AIR QUALITY SETTING

This section provides an overview of the existing air quality conditions in the Project area and region.

## 2.1 SOUTH COAST AIR BASIN

The Project site is located in the South Coast Air Basin (SCAB) within the jurisdiction of SCAQMD (9). The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As discussed above, the Project site is located within the South Coast Air Basin, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County. The larger South Coast district boundary includes 10,743 square miles.

The SCAB is bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bound by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bound by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

## 2.2 REGIONAL CLIMATE

The regional climate has a substantial influence on air quality in the Basin. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the Basin vary from the low to middle 60s (degrees Fahrenheit). Due to a decreased marine influence, the eastern portion of the Basin shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the Basin, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the Basin have recorded maximum temperatures above 100°F.

Although the climate of the Basin can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of Basin climate. Humidity restricts visibility in the Basin, and the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the Basin is 71 percent along the coast and 59 percent inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the Basin's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the Basin with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the Basin. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14½ hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the Basin is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the Basin is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the Basin, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire Basin. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as $NO_x$ and CO from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

## 2.3 WIND PATTERNS AND PROJECT LOCATION

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

## 2.4 EXISTING AIR QUALITY

Existing air quality is measured at established SCAQMD air quality monitoring stations. Monitored air quality is evaluated and in the context of ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) currently in effect, as well health effects of each pollutant regulated under these standards are shown in Table 2-1 (10) (11).

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state and federal standards presented in Table 2-1. The air quality in a region is considered to be in attainment by the state if the measured ambient air pollutant levels for $O_3$, CO, $SO_2$, $NO_2$, $PM_{10}$, and $PM_{2.5}$ are not equaled or exceeded at any time in any consecutive three-year period; and the federal standards (other than $O_3$, $PM_{10}$, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not exceeded more than once per year. The $O_3$ standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For $PM_{10}$, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

**TABLE 2-1: AMBIENT AIR QUALITY STANDARDS (1 OF 2)**

| Ambient Air Quality Standards | | | | | | |
|---|---|---|---|---|---|---|
| **Pollutant** | **Averaging Time** | **California Standards [1]** | | **National Standards [2]** | | |
| | | **Concentration [3]** | **Method [4]** | **Primary [3,5]** | **Secondary [3,6]** | **Method [7]** |
| **Ozone ($O_3$)[8]** | 1 Hour | 0.09 ppm (180 µg/m$^3$) | Ultraviolet Photometry | — | Same as Primary Standard | Ultraviolet Photometry |
| | 8 Hour | 0.070 ppm (137 µg/m$^3$) | | 0.070 ppm (137 µg/m$^3$) | | |
| **Respirable Particulate Matter (PM10)[9]** | 24 Hour | 50 µg/m$^3$ | Gravimetric or Beta Attenuation | 150 µg/m$^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 20 µg/m$^3$ | | — | | |
| **Fine Particulate Matter (PM2.5)[9]** | 24 Hour | — | — | 35 µg/m$^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 12 µg/m$^3$ | Gravimetric or Beta Attenuation | 12.0 µg/m$^3$ | 15 µg/m$^3$ | |
| **Carbon Monoxide (CO)** | 1 Hour | 20 ppm (23 mg/m$^3$) | Non-Dispersive Infrared Photometry (NDIR) | 35 ppm (40 mg/m$^3$) | — | Non-Dispersive Infrared Photometry (NDIR) |
| | 8 Hour | 9.0 ppm (10 mg/m$^3$) | | 9 ppm (10 mg/m$^3$) | — | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 mg/m$^3$) | | — | — | |
| **Nitrogen Dioxide ($NO_2$)[10]** | 1 Hour | 0.18 ppm (339 µg/m$^3$) | Gas Phase Chemiluminescence | 100 ppb (188 µg/m$^3$) | — | Gas Phase Chemiluminescence |
| | Annual Arithmetic Mean | 0.030 ppm (57 µg/m$^3$) | | 0.053 ppm (100 µg/m$^3$) | Same as Primary Standard | |
| **Sulfur Dioxide ($SO_2$)[11]** | 1 Hour | 0.25 ppm (655 µg/m$^3$) | Ultraviolet Fluorescence | 75 ppb (196 µg/m$^3$) | — | Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method) |
| | 3 Hour | — | | — | 0.5 ppm (1300 µg/m$^3$) | |
| | 24 Hour | 0.04 ppm (105 µg/m$^3$) | | 0.14 ppm (for certain areas)[11] | — | |
| | Annual Arithmetic Mean | — | | 0.030 ppm (for certain areas)[11] | — | |
| **Lead[12,13]** | 30 Day Average | 1.5 µg/m$^3$ | Atomic Absorption | — | — | High Volume Sampler and Atomic Absorption |
| | Calendar Quarter | — | | 1.5 µg/m$^3$ (for certain areas)[12] | Same as Primary Standard | |
| | Rolling 3-Month Average | — | | 0.15 µg/m$^3$ | | |
| **Visibility Reducing Particles[14]** | 8 Hour | See footnote 14 | Beta Attenuation and Transmittance through Filter Tape | **No National Standards** | | |
| **Sulfates** | 24 Hour | 25 µg/m$^3$ | Ion Chromatography | | | |
| **Hydrogen Sulfide** | 1 Hour | 0.03 ppm (42 µg/m$^3$) | Ultraviolet Fluorescence | | | |
| **Vinyl Chloride[12]** | 24 Hour | 0.01 ppm (26 µg/m$^3$) | Gas Chromatography | | | |

**See footnotes on next page …**

For more information please call ARB-PIO at (916) 322-2990 — California Air Resources Board (5/4/16)

## TABLE 2-1: AMBIENT AIR QUALITY STANDARDS (1 OF 2)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour $SO_2$ standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 $SO_2$ national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

**For more information please call ARB-PIO at (916) 322-2990** **California Air Resources Board (5/4/16)**

## 2.5 REGIONAL AIR QUALITY

The SCAQMD monitors levels of various criteria pollutants at 38 permanent monitoring stations and 5 single-pollutant source Lead (Pb) air monitoring sites throughout the air district (12). In 2015, the federal and state ambient air quality standards (NAAQS and CAAQS) were exceeded on one or more days for ozone, $PM_{10}$, and $PM_{2.5}$ at most monitoring locations (13). No areas of the SCAB exceeded federal or state standards for $NO_2$, $SO_2$, CO, sulfates or lead. See Table 2-2, for attainment designations for the SCAB (14) (15). Appendix 2.1 provides geographic representation of the state and federal attainment status for applicable criteria pollutants within the SCAB.

**TABLE 2-2: ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SOUTH COAST AIR BASIN (SCAB)**

| Criteria Pollutant | State Designation | Federal Designation |
|---|---|---|
| Ozone - 1hour standard | Nonattainment | Nonattainment ("extreme") |
| Ozone - 8 hour standard | Nonattainment | Nonattainment ("extreme") |
| $PM_{10}$ | Nonattainment | Attainment (Maintenance) |
| $PM_{2.5}$ | Nonattainment | Nonattainment ("serious") |
| Carbon Monoxide | Attainment | Attainment (Maintenance) |
| Nitrogen Dioxide | Attainment | Unclassifiable/Attainment |
| Sulfur Dioxide | Attainment | Unclassifiable/Attainment |
| Lead[1] | Attainment | Nonattainment (Partial) |

Source: State/Federal designations were taken from http://www.arb.ca.gov/desig/adm/adm.htm
Note: See Appendix 2.1 for a detailed map of State/National Area Designations within the South Coast Air Basin

## 2.6 LOCAL AIR QUALITY

Relative to the Project site, the nearest long-term air quality monitoring site for Ozone ($O_3$), Carbon Monoxide (CO), Nitrogen Dioxide ($NO_2$), and Inhalable Particulates ($PM_{10}$) is the South Coast Air Quality Management District Northwest San Bernardino Valley monitoring station, located approximately 0.90 miles south of the Project site in Upland (SRA 32). Relative to the Project site, the nearest long-term air quality monitoring site for Ultra-Fine Particulates ($PM_{2.5}$) is the South Coast Air Quality Management District Southwest San Bernardino Valley monitoring station, located approximately 5.5 miles south of the Project site in Fontana (SRA 33). It should be noted that the San Bernardino Valley monitoring station was utilized in lieu of the Northwest San Bernardino Valley monitoring station only in instances where data was not available from the Northwest San Bernardino Valley site.

The most recent three (3) years of data available is shown on Table 2-3, and identifies the number of days ambient air quality standards were exceeded for the study area, which is considered to be representative of the local air quality at the Project site (16). Additionally, data for $SO_2$ has been omitted as attainment is regularly met in the South Coast Air Basin and few monitoring

[1] The Federal nonattainment designation for lead is only applicable towards the Los Angeles County portion of the SCAB.

stations measure $SO_2$ concentrations. It should be noted that the table below is provided for informational purposes.

**TABLE 2-3: PROJECT AREA AIR QUALITY MONITORING SUMMARY 2014-2016**

| POLLUTANT | STANDARD | YEAR | | |
|---|---|---|---|---|
| | | 2014 | 2015 | 2016 |
| Ozone ($O_3$) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 0.126 | 0.136 | 0.156 |
| Maximum 8-Hour Concentration (ppm) | | 0.101 | 0.106 | 0.116 |
| Number of Days Exceeding State 1-Hour Standard | > 0.09 ppm | 34 | 49 | 53 |
| Number of Days Exceeding State 8-Hour Standard | > 0.070 ppm | 60 | 53 | 89 |
| Number of Days Exceeding Federal 8-Hour Standard | > 0.070 ppm | 57 | 66 | 65 |
| Carbon Monoxide (CO) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 3.0 | 2.1 | 1.7 |
| Maximum 8-Hour Concentration (ppm) | | 1.2 | 1.3 | 1.3 |
| Nitrogen Dioxide ($NO_2$) | | | | |
| Maximum 1-Hour Concentration (ppm) | | 0.074 | 0.072 | 0.070 |
| Annual Arithmetic Mean Concentration (ppm) | | 0.017 | 0.015 | 0.017 |
| Particulate Matter ≤ 10 Microns ($PM_{10}$) | | | | |
| Maximum 24-Hour Concentration ($\mu g/m^3$) | | 80 | 77 | 72 |
| Number of Samples | | 356 | 336 | 363 |
| Number of Samples Exceeding State Standard | > 50 $\mu g/m^3$ | 9 | 12 | 5 |
| Number of Samples Exceeding Federal Standard | > 150 $\mu g/m^3$ | 0 | 0 | 0 |
| Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$) | | | | |
| Maximum 24-Hour Concentration ($\mu g/m^3$) | | 78.9 | 47.3 | 30.45 |
| Annual Arithmetic Mean ($\mu g/m^3$) | | 13.2 | 10.7 | 12.04 |
| Number of Samples Exceeding Federal 24-Hour Standard | > 35 $\mu g/m^3$ | 1 | 2 | 0 |

-- = data not available from SCAQMD or ARB
Source: SCAQMD's Air Quality Data Tables and ARB's iADAM Top 4 Summary

Criteria pollutants are pollutants that are regulated through the development of human health based and/or environmentally based criteria for setting permissible levels. Criteria pollutants, their typical sources, and effects are identified below:

- Carbon Monoxide (CO): Is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone, motor vehicles operating at slow speeds are the primary source of CO in the Basin. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.

- Sulfur Dioxide ($SO_2$): Is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When $SO_2$ oxidizes in the atmosphere, it forms sulfates ($SO_4$). Collectively, these pollutants are referred to as sulfur oxides ($SO_X$).
- Nitrogen Oxides (Oxides of Nitrogen, or $NO_x$): Nitrogen oxides ($NO_x$) consist of nitric oxide (NO), nitrogen dioxide ($NO_2$) and nitrous oxide ($N_2O$) and are formed when nitrogen ($N_2$) combines with oxygen ($O_2$). Their lifespan in the atmosphere ranges from one to seven days for nitric oxide and nitrogen dioxide, to 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. $NO_2$ is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility. Of the seven types of nitrogen oxide compounds, $NO_2$ is the most abundant in the atmosphere. As ambient concentrations of $NO_2$ are related to traffic density, commuters in heavy traffic may be exposed to higher concentrations of $NO_2$ than those indicated by regional monitors.
- Ozone ($O_3$): Is a highly reactive and unstable gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides ($NO_X$), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.
- $PM_{10}$ (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. $PM_{10}$ also causes visibility reduction and is a criteria air pollutant.
- $PM_{2.5}$ (Particulate Matter less than 2.5 microns): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from $SO_2$ release from power plants and industrial facilities and nitrates that are formed from $NO_X$ release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions. $PM_{2.5}$ is a criteria air pollutant.
- Volatile Organic Compounds (VOC): Volatile organic compounds are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOCs contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent when exposed to photochemical processes. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. VOCs are a criteria pollutant since they are a precursor to $O_3$, which is a criteria pollutant. The SCAQMD uses the terms VOC and ROG (see below) interchangeably.
- Reactive Organic Gases (ROG): Similar to VOC, Reactive Organic Gases (ROG) are also precursors in forming ozone and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons, which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the

presence of sunlight. ROGs are a criteria pollutant since they are a precursor to $O_3$, which is a criteria pollutant. The SCAQMD uses the terms ROG and VOC (see previous) interchangeably.

- Lead (Pb): Lead is a heavy metal that is highly persistent in the environment. In the past, the primary source of lead in the air was emissions from vehicles burning leaded gasoline. As a result of the removal of lead from gasoline, there have been no violations at any of the SCAQMD's regular air monitoring stations since 1982. Currently, emissions of lead are largely limited to stationary sources such as lead smelters. It should be noted that the Project is not anticipated to generate a quantifiable amount of lead emissions. Lead is a criteria air pollutant.

Health Effects of Air Pollutants

Ozone

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels are associated with increased school absences. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in communities with high ozone levels.

Ozone exposure under exercising conditions is known to increase the severity of the responses described above. Animal studies suggest that exposure to a combination of pollutants that includes ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

Carbon Monoxide

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport and competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Reduction in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO, resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels; these include pre-term births and heart abnormalities.

Particulate Matter

A consistent correlation between elevated ambient fine particulate matter ($PM_{10}$ and $PM_{2.5}$) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in $PM_{2.5}$ concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long term exposure to particulate matter.

The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of $PM_{10}$ and $PM_{2.5}$.

Nitrogen Dioxide

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposure to $NO_2$ at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to $NO_2$ in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

In animals, exposure to levels of $NO_2$ considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and $NO_2$.

Sulfur Dioxide

A few minutes of exposure to low levels of $SO_2$ can result in airway constriction in some asthmatics, all of whom are sensitive to its effects. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to $SO_2$. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of $SO_2$.

Animal studies suggest that despite $SO_2$ being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient $SO_2$ levels. In these studies, efforts to

separate the effects of $SO_2$ from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

Lead

Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are associated with increased blood pressure.

Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system. Pb can be stored in the bone from early age environmental exposure, and elevated blood Pb levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of Pb because of previous environmental Pb exposure of their mothers.

Odors

The science of odor as a health concern is still new. Merely identifying the hundreds of VOCs that cause odors poses a big challenge. Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, studies have shown that the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

## 2.7 REGULATORY BACKGROUND

### 2.7.1 FEDERAL REGULATIONS

The U.S. EPA is responsible for setting and enforcing the NAAQS for $O_3$, CO, $NO_x$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead (17). The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955, and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal air quality standards, the NAAQS, and specifies future dates for achieving compliance (18). The CAA also mandates that states submit and implement State Implementation Plans (SIPs) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment

and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions). Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants $O_3$, $NO_2$, $SO_2$, $PM_{10}$, CO, $PM_{2.5}$, and lead. The NAAQS were amended in July 1997 to include an additional standard for $O_3$ and to adopt a NAAQS for PM2.5. Table 2-1 (previously presented) provides the NAAQS within the basin.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and nitrogen oxides ($NO_x$). $NO_x$ is a collective term that includes all forms of nitrogen oxides (NO, $NO_2$, $NO_3$) which are emitted as byproducts of the combustion process.

### 2.7.2 CALIFORNIA REGULATIONS

The CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. The California CAA mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. However at this time, hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS (19) (17).

Local air quality management districts, such as the SCAQMD, regulate air emissions from commercial and light industrial facilities. All basins have been formally designated as attainment or non-attainment for each CAAQS.

Non-attainment areas are required to prepare air quality management plans that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);
- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;
- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a five percent or more annual reduction in emissions or 15 percent or more in a period of three years for ROGs, $NO_x$, CO and $PM_{10}$. However, air basins may

use alternative emission reduction strategy that achieves a reduction of less than five percent per year under certain circumstances.

### 2.7.3 AIR QUALITY MANAGEMENT PLANNING

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In regards to the NAAQS, the Project region within the SCAB is in nonattainment for ozone (8-hour) and $PM_{2.5}$. For the CAAQS, the Project region within the SCAB is in nonattainment for ozone (1-hour and 8-hour), $PM_{10}$, and $PM_{2.5}$. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards (20). AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy. A detailed discussion on the AQMP and Project consistency with the AQMP is provided in Section 3.9.

## 2.8 EXISTING PROJECT SITE AIR QUALITY CONDITIONS

Existing air quality conditions at the Project site would generally reflect ambient monitored conditions as presented previously at Table 2-3.

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# 3 PROJECT AIR QUALITY IMPACT

## 3.1 INTRODUCTION

The Project has been evaluated to determine if it will violate an air quality standard or contribute to an existing or projected air quality violation. Additionally, the Project has been evaluated to determine if it will result in a cumulatively considerable net increase of a criteria pollutant for which the SCAB is in non-attainment under an applicable federal or state ambient air quality standard. The significance of these potential impacts is described in the following section.

## 3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related air quality impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would (21):

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

The SCAQMD has also developed regional and localized significance thresholds for other regulated pollutants, as summarized at Table 3-1 (22). The SCAQMD's CEQA Air Quality Significance Thresholds (March 2015) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

**TABLE 3-1: MAXIMUM DAILY EMISSIONS THRESHOLDS (1 OF 2)**

| Pollutant | Construction | Operations |
|---|---|---|
| **Regional Thresholds** | | |
| $NO_x$ | 100 lbs/day | 55 lbs/day |
| VOC | 75 lbs/day | 55 lbs/day |
| $PM_{10}$ | 150 lbs/day | 150 lbs/day |
| $PM_{2.5}$ | 55 lbs/day | 55 lbs/day |
| $SO_x$ | 150 lbs/day | 150 lbs/day |
| CO | 550 lbs/day | 550 lbs/day |
| Lead | 3 lbs/day | 3 lbs/day |

**TABLE 3-1: MAXIMUM DAILY EMISSIONS THRESHOLDS (2 OF 2)**

| Pollutant | Construction | Operations |
|---|---|---|
| **Localized Thresholds** | | |
| $NO_x$ | 220 lbs/day (site preparation) | N/A |
| | 187 lbs/day (grading) | |
| CO | 1,713 lbs/day (site preparation) | N/A |
| | 1,392 lbs/day (grading) | |
| $PM_{10}$ | 11 lbs/day (site preparation) | N/A |
| | 8 lbs/day (grading) | |
| $PM_{2.5}$ | 7 lbs/day (site preparation) | N/A |
| | 6 lb/day (grading) | |

## 3.3 PROJECT-RELATED SOURCES OF POTENTIAL IMPACT

Land uses such as the Project affect air quality through construction-source and operational-source emissions.

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant ($NO_x$, VOC, $PM_{10}$, $PM_{2.5}$, $SO_x$, and CO) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (23). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine construction and operational air quality emissions. Output from the model runs for both construction and operational activity are provided in Appendix 3.1 to 3.3.

## 3.4 CONSTRUCTION EMISSIONS

Construction activities associated with the Project will result in emissions of VOCs, $NO_x$, $SO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

Construction is expected to commence in January 2019 and will last through February 2020. Construction duration by phase is shown on Table 3-2. The construction schedule utilized in the

analysis represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent.[2] The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per CEQA guidelines. Site specific construction fleet may vary due to specific project needs at the time of construction. The duration of construction activity was based on a 2020 opening year and CalEEMod defaults. The associated construction equipment was generally based on CalEEMod 2016.3.2 defaults. Please refer to specific detailed modeling inputs/outputs contained in Appendix 3.1 of this analysis. A detailed summary of construction equipment assumptions by phase is provided at Table 3-3.

Dust is typically a major concern during rough grading activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod model was utilized to calculate fugitive dust emissions resulting from this phase of activity. According to information provided by the client, the Project site is expected to require an estimated 40,000 cubic yards of import.

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information from the applicant and the CalEEMod model.

**TABLE 3-2: CONSTRUCTION DURATION**

| Phase Name | Start Date | End Date | Days |
|---|---|---|---|
| Site Preparation | 01/01/2019 | 01/14/2019 | 10 |
| Grading | 01/15/2019 | 02/11/2019 | 20 |
| Building Construction | 02/12/2019 | 12/30/2019 | 230 |
| Paving | 12/31/2019 | 01/27/2020 | 20 |
| Architectural Coating | 01/28/2020 | 02/24/2020 | 20 |

[2] As shown in the California Emissions Estimator Model (CalEEMod) User's Guide Version 2016.3.2, Section 4.3 "OFFROAD Equipment" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

**TABLE 3-3: CONSTRUCTION EQUIPMENT**

| Activity | Equipment | Amount | Hours Per Day |
|---|---|---|---|
| Site Preparation | Crawler Tractors | 4 | 8 |
| | Rubber Tired Dozers | 3 | 8 |
| Grading | Crawler Tractors | 3 | 8 |
| | Excavators | 1 | 8 |
| | Graders | 1 | 8 |
| | Rubber Tired Dozers | 1 | 8 |
| Building Construction | Cranes | 1 | 8 |
| | Crawler Tractors | 3 | 8 |
| | Forklifts | 3 | 8 |
| | Generator Sets | 1 | 8 |
| | Welders | 1 | 8 |
| Paving | Paving Equipment | 2 | 8 |
| | Rollers | 2 | 8 |
| | Pavers | 2 | 8 |
| Architectural Coating | Air Compressors | 1 | 8 |

### 3.4.1 CONSTRUCTION EMISSIONS SUMMARY

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to: Rule 1113 (Architectural Coatings) (3); Rule 431.2 (Low Sulfur Fuel) (4); Rule 403 (Fugitive Dust) (5); and Rule 1186 / 1186.1 (Street Sweepers) (6). It should be noted that Best Available Control Measures (BACMs) are not mitigation as they are standard regulatory requirements. Notwithstanding, credit for Rule 403 and Rule 1113 have been taken as BACM AQ-1 and BACM AQ-2, respectively.

***Impacts without Mitigation***

The estimated maximum daily construction emissions without mitigation are summarized on Table 3-4. Detailed construction model outputs are presented in Appendix 3.1. Under the assumed scenarios, emissions resulting from the Project construction has the potential to exceed numerical thresholds established by the SCAQMD for emissions of $NO_x$.

**TABLE 3-4: EMISSIONS SUMMARY OF OVERALL CONSTRUCTION (WITHOUT MITIGATION)**

| Year | Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | **VOC** | **$NO_x$** | **CO** | **$SO_x$** | **$PM_{10}$** | **$PM_{2.5}$** |
| 2019 | 5.94 | 111.75 | 28.68 | 0.24 | 11.04 | 6.75 |
| 2020 | 49.91 | 14.12 | 15.21 | 0.02 | 0.92 | 0.74 |
| **Maximum Daily Emissions** | **49.91** | **111.75** | **28.68** | **0.24** | **11.04** | **6.75** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **NO** | **YES** | **NO** | **NO** | **NO** | **NO** |

***Impacts with Mitigation***

The estimated maximum daily construction emissions with mitigation are summarized on Table 3-5. Detailed construction model outputs are presented in Appendix 3.2. MM AQ-1 is recommended to reduce the severity of the impacts. After implementation of MM AQ-1, Project construction-source emissions will be less than significant.

**TABLE 3-5: EMISSIONS SUMMARY OF OVERALL CONSTRUCTION (WITH MITIGATION)**

| Year | Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | **VOC** | **$NO_x$** | **CO**[3] | **$SO_x$** | **$PM_{10}$** | **$PM_{2.5}$** |
| 2018 | 2.91 | 87.30 | 36.05 | 0.24 | 9.10 | 5.04 |
| 2019 | 49.91 | 14.12 | 15.21 | 0.02 | 0.92 | 0.74 |
| **Maximum Daily Emissions** | **49.91** | **87.30** | **36.05** | **0.24** | **9.10** | **5.04** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

## 3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of VOCs, $NO_x$, $SO_x$, CO, $PM_{10}$, and $PM_{2.5}$. Operational emissions would be expected from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions

### 3.5.1 AREA SOURCE EMISSIONS

Architectural Coatings

Over a period of time the buildings that are part of this Project will be subject to emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other

[3] After implementation of Tier 3 mitigation, CO emissions increase due to CalEEMod calculations.

surface coatings as part of Project maintenance. The emissions associated with architectural coatings were calculated using the CalEEMod model.

Consumer Products

Consumer products include, but are not limited to detergents, cleaning compounds, polishes, personal care products, and lawn and garden products. Many of these products contain organic compounds which when released in the atmosphere can react to form ozone and other photochemically reactive pollutants. The emissions associated with use of consumer products were calculated based on defaults provided within the CalEEMod model.

Hearths/Fireplaces

The emissions associated with use of hearths/fireplaces were calculated based on assumptions provided in the CalEEMod model. The Project is required to comply with SCAQMD Rule 445, which prohibits the use of wood burning stoves and fireplaces in new development. In order to account for the requirements of this Rule, the unmitigated CalEEMod model estimates were adjusted to remove wood burning stoves and fireplaces. As the project is required to comply with SCAQMD Rule 445, the removal of wood burning stoves and fireplaces is not considered "mitigation" although it must be identified as such in CalEEMod in order to treat the case appropriately.

Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod model.

### 3.5.2 ENERGY SOURCE EMISSIONS

Combustion Emissions Associated with Natural Gas and Electricity

Electricity and natural gas are used by almost every project. Criteria pollutant emissions are emitted through the generation of electricity and consumption of natural gas. However, because electrical generating facilities for the Project area are located either outside the region (state) or offset through the use of pollution credits (RECLAIM) for generation within the SCAB, criteria pollutant emissions from offsite generation of electricity is generally excluded from the evaluation of significance and only natural gas use is considered. The emissions associated with natural gas use were calculated using the CalEEMod model.

### 3.5.3 MOBILE SOURCE EMISSIONS

Vehicles

Project mobile source air quality impacts are dependent on both overall daily vehicle trip generation and the effect of the Project on peak hour traffic volumes and traffic operations in the vicinity of the Project. The Project-related operational air quality impacts are derived

primarily from vehicle trips generated by the Project. Trip characteristics available from the report, *Upland Colonies Traffic Impact Analysis* (Urban Crossroads, Inc. 2018) were utilized in this analysis (2). The proposed Project is anticipated to generate a net total of 623 trip-ends per day with 50 AM peak hour trips and 65 PM peak hour trips.

Fugitive Dust Related to Vehicular Travel

Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust inclusive of tire wear particulates. The emissions estimates for travel on paved roads were calculated using the CalEEMod model.

### 3.5.4 OPERATIONAL EMISSIONS SUMMARY

Operational-source emissions are summarized on Table 3-6. Detailed construction model outputs are presented in Appendix 3.3. As indicated, the Project would not exceed regional thresholds of significance established by the SCAQMD. Therefore, Project operational-source emissions would be considered less than significant.

**TABLE 3-6: MAXIMUM DAILY OPERATIONAL EMISSIONS SUMMARY**

| Operational Activities – Summer Scenario | Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_x$ | CO | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Area Source | 3.70 | 1.16 | 5.93 | 0.01 | 0.12 | 0.12 |
| Energy Source | 0.06 | 0.51 | 0.22 | 3.25E-03 | 0.04 | 0.05 |
| Mobile | 1.55 | 9.73 | 18.66 | 0.07 | 4.64 | 1.28 |
| **Total Maximum Daily Emissions** | **5.31** | **11.40** | **24.80** | **0.08** | **4.80** | **1.44** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |
| **Operational Activities – Winter Scenario** | **Emissions (pounds per day)** | | | | | |
| | **VOC** | **$NO_x$** | **CO** | **$SO_x$** | **$PM_{10}$** | **$PM_{2.5}$** |
| Area Source | 3.70 | 1.16 | 5.93 | 0.01 | 0.12 | 0.12 |
| Energy Source | 0.06 | 0.51 | 0.22 | 3.25E-03 | 0.04 | 0.05 |
| Mobile | 1.36 | 9.79 | 16.35 | 0.06 | 4.64 | 1.28 |
| **Total Maximum Daily Emissions** | **5.12** | **11.46** | **22.50** | **0.07** | **4.80** | **1.44** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| **Threshold Exceeded?** | **NO** | **NO** | **NO** | **NO** | **NO** | **NO** |

## 3.6 LOCALIZED SIGNIFICANCE - CONSTRUCTION ACTIVITY

#### BACKGROUND ON LOCALIZED SIGNIFICANCE THRESHOLD (LST) DEVELOPMENT

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (Methodology) (19). The SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the federal and/or state ambient air quality standards (NAAQS/CAAQS). Collectively, these are referred to as Localized Significance Thresholds (LSTs).

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of any given project are above or below State standards. In the case of CO and $NO_2$, if ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to $PM_{10}$ and $PM_{2.5}$; both of which are non-attainment pollutants.

The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (LST Methodology) (24).

**EMISSIONS CONSIDERED**

SCAQMD's Methodology clearly states that "off-site mobile emissions from the Project should NOT be included in the emissions compared to LSTs (25)." Therefore, for purposes of the construction LST analysis only emissions included in the CalEEMod "on-site" emissions outputs were considered.

**APPLICABILITY OF LSTS FOR THE PROJECT**

This project is located in Source Receptor Area (SRA) 32, Northwest San Bernardino Valley. For this Project, the appropriate SRA for the LST is the Northwest San Bernardino Valley monitoring station (SRA 32). LSTs apply to carbon monoxide (CO), nitrogen dioxide ($NO_2$), particulate matter ≤ 10 microns ($PM_{10}$), and particulate matter ≤ 2.5 microns ($PM_{2.5}$). The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size.

In order to determine the appropriate methodology for determining localized impacts that could occur as a result of Project-related construction, the following process is undertaken:

- The CalEEMod model is utilized to determine the maximum daily on-site emissions that will occur during construction activity.
- The SCAQMD's Fact Sheet for Applying CalEEMod to Localized Significance Thresholds (26) is used to determine the maximum site acreage that is actively disturbed based on the construction equipment fleet and equipment hours as estimated in CalEEMod.
- If the total acreage disturbed is less than or equal to five acres per day, then the SCAQMD's screening look-up tables are utilized to determine if a Project has the potential to result in a significant impact (the SCAQMD recommends that Projects exceeding the screening look-up

tables undergo dispersion modeling to determine actual impacts). The look-up tables establish a maximum daily emissions threshold in pounds per day that can be compared to CalEEMod outputs.

**MAXIMUM DAILY DISTURBED-ACREAGE**

Table 3-7 is used to determine the maximum daily disturbed-acreage for purposes of modeling localized emissions. As shown, the proposed Project could actively disturb approximately 3.5 acres per day during the site preparation, and 2.5 acres per day during the grading phase of construction.

**TABLE 3-7: MAXIMUM DAILY DISTURBED-ACREAGE**

| Construction Phase | Equipment Type | Equipment Quantity | Acres graded per 8-hour day | Operating Hours per Day | Acres graded per day |
|---|---|---|---|---|---|
| Site Preparation | Crawler Tractors | 4 | 0.5 | 8 | 2.0 |
| | Graders | 0 | 0.5 | 8 | 0 |
| | Rubber Tired Dozers | 3 | 0.5 | 8 | 1.5 |
| | Scrapers | 0 | 1 | 8 | 0 |
| Total acres disturbed per day during Site Preparation | | | | | 3.5 |
| **Construction Phase** | **Equipment Type** | **Equipment Quantity** | **Acres graded per 8-hour day** | **Operating Hours per Day** | **Acres graded per day** |
| Grading | Crawler Tractors | 3 | 0.5 | 8 | 1.5 |
| | Graders | 1 | 0.5 | 8 | 0.5 |
| | Rubber Tired Dozers | 1 | 0.5 | 8 | 0.5 |
| | Scrapers | 0 | 1 | 8 | 0 |
| Total acres disturbed per day during Grading | | | | | 2.5 |

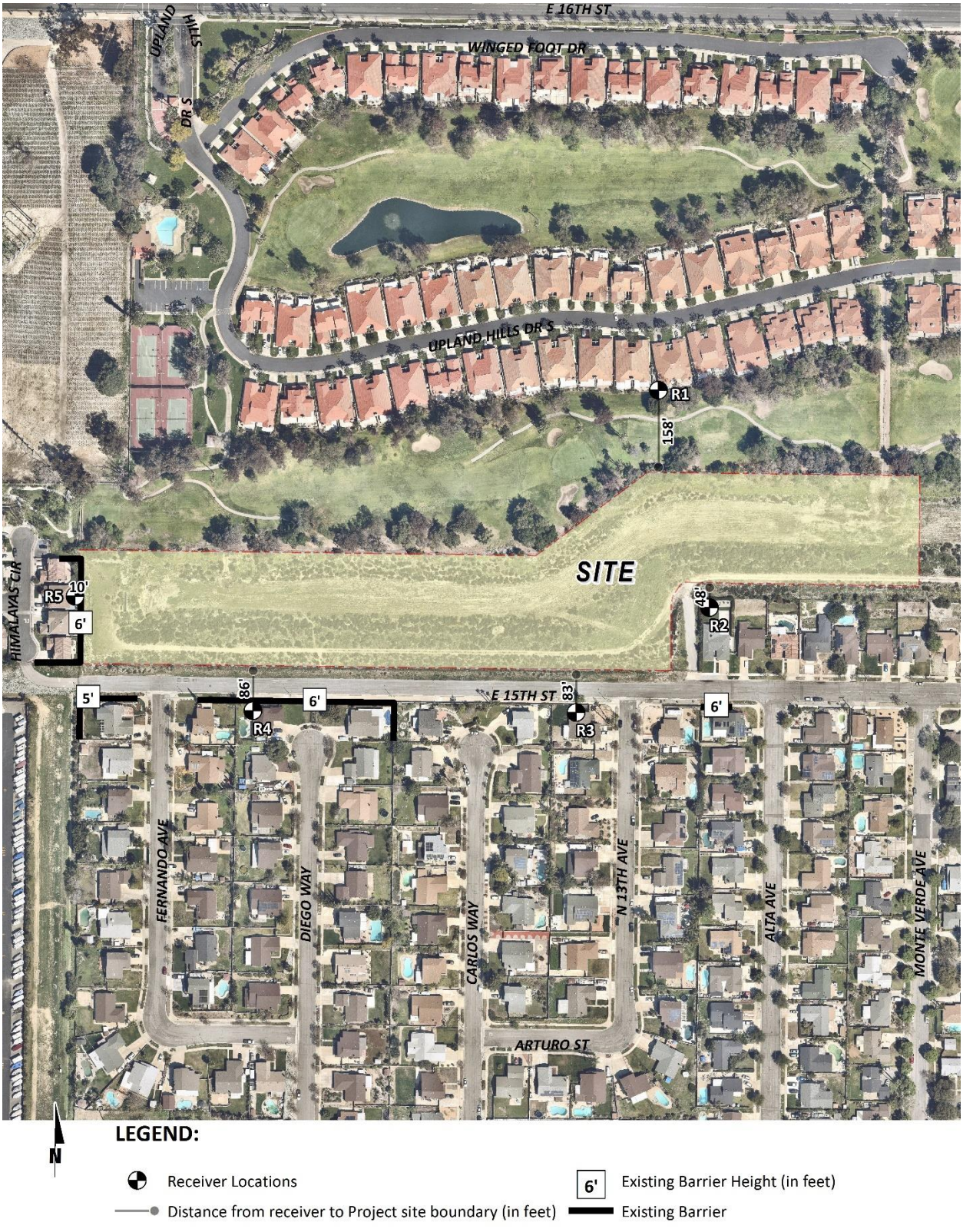
### *Sensitive Receptors*

Some people are especially sensitive to air pollution and are given special consideration when evaluating air quality impacts from projects. These groups of people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather to exercise are defined as "sensitive receptors". Sensitive receivers near the Project site include existing single-family residential homes to the north, south, east, and west of the Project site, as described below and as shown on Exhibit 3-A.

R1: Located approximately 158 feet north of the Project site, R1 represents the existing residential outdoor living areas (backyards) across an existing golf course from the Project site.

R2: Located approximately 48 feet south of the Project site, R2 represents the existing residential outdoor living areas (backyards) of homes on 15th Street.

## EXHIBIT 3-A: RECEPTOR LOCATIONS



R3: Located approximately 83 feet south of the Project site, R3 represents the existing residential outdoor living areas (backyards) south of 15th Street.

R4: Located approximately 86 feet south of the Project site, R4 represents the existing residential outdoor living areas (backyards) south of 15th Street.

R5: Located approximately 10 feet west of the Project site, R5 represents the existing residential outdoor living areas (backyards) adjacent to the western Project site boundaries.

The nearest sensitive receptors are existing residential homes approximately 10 feet/3.05 meters west of the Project site. Notwithstanding, the Methodology explicitly states that "It is possible that a project may have receptors closer than 25 meters. Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters (27)." Accordingly, LSTs for receptors at 25 meters are utilized in this analysis and provide for a conservative i.e. "health protective" standard of care.

#### CONSTRUCTION-SOURCE EMISSIONS LST ANALYSIS

Since the total acreage disturbed is less than or equal to five acres per day for both the site preparation phase and the grading phase, the SCAQMD's screening look-up tables are utilized in determining impacts. As previously noted, a 25-meter receptor distance is utilized to determine the LSTs for emissions of CO, $NO_2$, $PM_{10}$, and $PM_{2.5}$.

### *Impacts without Mitigation*

Table 3-8 identifies the localized impacts at the nearest receptor location in the vicinity of the Project. Without mitigation, emissions would not exceed the applicable thresholds of significance for any criteria pollutants. Outputs from the model runs for construction LSTs are provided in Appendix 3.1.

**TABLE 3-8: LOCALIZED SIGNIFICANCE SUMMARY CONSTRUCTION (UNMITIGATED)**

| **On-Site Site Preparation Emissions** | **Emissions (pounds per day)** | | | |
|---|---|---|---|---|
| | **$NO_x$** | **CO** | **$PM_{10}$** | **$PM_{2.5}$** |
| **Maximum Daily Emissions** | 68.11 | 23.14 | 10.84 | 6.69 |
| SCAQMD Localized Threshold | 220 | 1,713 | 11 | 7 |
| **Threshold Exceeded?** | **NO** | **NO** | **NO** | **NO** |
| **On-Site Grading Emissions** | **Emissions (pounds per day)** | | | |
| | **$NO_x$** | **CO** | **$PM_{10}$** | **$PM_{2.5}$** |
| **Maximum Daily Emissions** | 45.25 | 17.10 | 5.10 | 3.08 |
| SCAQMD Localized Threshold | 187 | 1,392 | 8 | 6 |
| **Threshold Exceeded?** | **NO** | **NO** | **NO** | **NO** |

## 3.7 LOCALIZED SIGNIFICANCE – LONG-TERM OPERATIONAL ACTIVITY

The proposed project involves the construction and operation of 66 single family residential dwelling units on 9.16 acres. According to SCAQMD LST methodology, LSTs would apply to the

operational phase of a proposed project if the project includes stationary sources, or attracts mobile sources that may spend long periods queuing and idling at the site (e.g., transfer facilities and warehouse buildings). The proposed project does not include such uses, and thus, due to the lack of significant stationary source emissions, no long-term localized significance threshold analysis is needed.

## 3.8 CO "HOT SPOT" ANALYSIS

As discussed below, the Project would not result in potentially adverse CO concentrations or "hot spots." Further, detailed modeling of Project-specific carbon monoxide (CO) "hot spots" is not needed to reach this conclusion.

An adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 ppm or the eight-hour standard of 9 ppm were to occur. At the time of the 1993 Handbook, the SCAB was designated nonattainment under the California AAQS and National AAQS for CO (28).

It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment, as previously noted in Table 2-2. Also, CO concentrations in the Project vicinity have steadily declined, as indicated by historical emissions data presented previously at Table 2-3.

To establish a more accurate record of baseline CO concentrations affecting the SCAB, a CO "hot spot" analysis was conducted in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards, as shown on Table 3-9.

**TABLE 3-9: CO MODEL RESULTS**

| Intersection Location | Carbon Monoxide Concentrations (ppm) | | |
|---|---|---|---|
| | Morning 1-hour | Afternoon 1-hour | 8-hour |
| Wilshire-Veteran | 4.6 | 3.5 | 4.2 |
| Sunset-Highland | 4 | 4.5 | 3.9 |
| La Cienega-Century | 3.7 | 3.1 | 5.8 |
| Long Beach-Imperial | 3 | 3.1 | 9.3 |

Source: 2003 AQMP

Notes: ppm: parts per million. Federal 1-hour standard is 35 ppm and the deferral 8-hour standard is 9.0 ppm.

Based on the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan), peak carbon monoxide concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of traffic volumes and congestion at a particular intersection. As evidence of this, for example, 9.3 ppm 8-hr CO concentration

measured at the Long Beach Blvd. and Imperial Hwy. intersection (highest CO generating intersection within the "hot spot" analysis), only 0.7 ppm was attributable to the traffic volumes and congestion at this intersection; the remaining 8.6 ppm were due to the ambient air measurements at the time the 2003 AQMP was prepared (28). In contrast, the ambient 8-hr CO concentration within the Project study area is estimated at 1.4 ppm—1.6 ppm (please refer to previous Table 2-3). Therefore, even if the traffic volumes for the proposed Project were double or even triple of the traffic volumes generated at the Long Beach Blvd. and Imperial Hwy. intersection, coupled with the on-going improvements in ambient air quality, the Project would not be capable of resulting in a CO "hot spot" at any study area intersections.

Similar considerations are also employed by other Air Districts when evaluating potential CO concentration impacts. More specifically, the Bay Area Air Quality Management District (BAAQMD) concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour—or 24,000 vehicles per hour where vertical and/or horizontal air does not mix—in order to generate a significant CO impact (2).

Traffic volumes generating the CO concentrations for the "hot spot" analysis, shown on Table 3-10. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm; this indicates that, should the daily traffic volume increase four times to 400,000 vehicles per day, CO concentrations (4.6 ppm x 4= 18.4 ppm) would still not likely exceed the most stringent 1-hour CO standard (20.0 ppm).[4] At buildout of the Project, the highest average daily trips on a segment of road would be 29,815 daily trips on east Alta Avenue and foothill Boulevard which is lower than the highest daily traffic volumes generated at the busiest intersection in the CO "hot spot" analysis (2).

**TABLE 3-10: TRAFFIC VOLUMES FOR INTERSECTIONS EVALUATED IN AQMP**

| Intersection Location | Peak Traffic Volumes (vph) | | | | |
|---|---|---|---|---|---|
| | Eastbound (AM/PM) | Westbound (AM/PM) | Southbound (AM/PM) | Northbound (AM/PM) | Total (AM/PM) |
| Wilshire-Veteran | 4,954/2,069 | 1,830/3,317 | 721/1,400 | 560/933 | 8,062/7,719 |
| Sunset-Highland | 1,417/1,764 | 1,342/1,540 | 2,304/1,832 | 1,551/2,238 | 6,614/5,374 |
| La Cienega-Century | 2,540/2,243 | 1,890/2,728 | 1,384/2,029 | 821/1,674 | 6,634/8,674 |
| Long Beach-Imperial | 1,217/2,020 | 1,760/1,400 | 479/944 | 756/1,150 | 4,212/5,514 |

Source: 2003 AQMP
Notes: vph-vehicles per hour

The proposed Project considered herein would not produce the volume of traffic required to generate a CO "hot spot" either in the context of the 2003 Los Angeles hot spot study, or based on representative BAAQMD CO threshold considerations, as shown on Table 3-11. Therefore, CO

4 Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).

"hot spots" are not an environmental impact of concern for the proposed Project. Localized air quality impacts related to mobile-source emissions would therefore be less than significant.

**TABLE 3-11: PROJECT TRAFFIC VOLUMES**

| Intersection Location | Peak Traffic Volumes (vph) | | | | |
|---|---|---|---|---|---|
| | Northbound (AM/PM) | Southbound (AM/PM) | Eastbound (AM/PM) | Westbound (AM/PM) | Total (AM/PM) |
| Campus Av./14th St. | 493/886 | 838/772 | 187/249 | 339/244 | 1,857/2,151 |
| Alta Av./14th St. | 79/67 | 81/42 | 155/203 | 103/110 | 417/422 |
| Alta Av./Foothill Bl. (SR-66) | 23/42 | 192/207 | 697/1,499 | 880/939 | 1,792/2,686 |
| Grove Av./Foothill Bl. (SR-66) | 403/578 | 167/317 | 583/1,423 | 925/937 | 2,078/3,255 |

## 3.9 AIR QUALITY MANAGEMENT PLANNING

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 10,743 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the Basin. In response, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

In March 2017, the AQMD released the Final 2016 AQMP. The 2016 AQMP continues to evaluate current integrated strategies and control measures to meet the NAAQS, as well as, explore new and innovative methods to reach its goals. Some of these approaches include utilizing incentive programs, recognizing existing co-benefit programs from other sectors, and developing a strategy with fair-share reductions at the federal, state, and local levels (29). Similar to the 2012 AQMP, the 2016 AQMP incorporates scientific and technological information and planning assumptions, including the 2016 RTP/SCS and updated emission inventory methodologies for various source categories (30). The Project's consistency with the AQMP will be determined using the 2016 AQMP as discussed below.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's CEQA Air Quality Handbook (1993) (31). These indicators are discussed below:

- Consistency Criterion No. 1: The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the

timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

**Construction Impacts**

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if localized significance thresholds (LSTs) or regional significance thresholds were exceeded. The Project would not exceed the applicable LST thresholds or regional significance thresholds for construction activity after the implementation of MM AQ-1. Therefore, the Project would not conflict with the AQMP according to this criterion.

**Operational Impacts**

The Project would not exceed the applicable LST thresholds or regional significance thresholds for operational activity. Therefore, the Project would not conflict with the AQMP according to this criterion.

On the basis of the preceding discussion, the Project is consistent with the first criterion.

- Consistency Criterion No. 2: The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.

**Overview**

The 2016 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the Southern California Association of Governments (SCAG), which develops regional growth forecasts, which are then used to develop future air quality forecasts for the AQMP. Development consistent with the growth projections in the City of Upland General Plan (referred to as the "General Plan") is considered to be consistent with the AQMP.

**Construction Impacts**

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities.

**Operational Impacts**

The General Plan currently designates the Project site as Public Utilities – Flood Control (PU-FC). As per the City's General Plan, the PU land use designation provides areas for landfills, flood control/recharge facilities, and public utilities including gas, electricity, and water (32). As indicated, the proposed Project will consist of 66 single family residential dwelling units which would likely exceed the growth intensities allowed within the General Plan. As such, the Project would have the potential to conflict with the AQMP.

**AQMP Consistency Conclusion**

The Project would have the potential to cause NAAQS or CAAQS violations. The Project would be inconsistent with the current general plan and zoning designation. As such, the Project has the potential to result in a significant impact with respect to the AQMP.

## 3.10 POTENTIAL IMPACTS TO SENSITIVE RECEPTORS

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Sensitive receptors can include uses such as long term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, child care centers, and athletic facilities can also be considered as sensitive receptors.

Results of the LST analysis indicate that, with application of mitigation, the Project will not exceed the SCAQMD localized significance thresholds during construction. Therefore, sensitive receptors would not be exposed to substantial criteria pollutant concentrations during Project construction.

Results of the LST analysis indicate that the Project will not exceed the SCAQMD localized significance thresholds during operational activity. Further Project traffic would not create or result in a CO "hotspot." Therefore sensitive receptors would not be exposed to substantial pollutant concentrations as the result of Project operations.

#### TOXIC AIR POLLUTANTS – PROJECT CONSTRUCTION

The construction equipment would emit diesel particulate matter (DPM), which is a carcinogen, However, the DPM emissions would be short-term in nature. Determination of risk from DPM is considered over a 70-year exposure time. As such, considering the short time frame for construction, exposure to DPM during construction is anticipated to be less than significant.

## 3.11 ODORS

Substantial odor-generating sources include land uses such as agricultural activities, feedlots, wastewater treatment facilities, landfills or various heavy industrial uses. The Project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential sources of operational odors generated by the Project would include disposal of miscellaneous commercial refuse. Consistent with County requirements, all Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations, thereby precluding substantial generation of odors due to temporary holding of refuse on-site. Moreover, SCAQMD Rule 402 acts to prevent occurrences of odor nuisances (33).

## 3.12 CUMULATIVE IMPACTS

Federal standards designated the Project area as an extreme non-attainment area for ozone, attainment for $PM_{10}$, and non-attainment for $PM_{2.5}$, and lead. State standards designated the Project area as nonattainment for ozone, $PM_{10}$, $PM_{2.5}$ and attainment for lead.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (34). In this report the AQMD clearly states (Page D-3):

*"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.*

*Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."*

Therefore, this analysis assumes that individual projects that do not generate operational or construction emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also not cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in nonattainment, and, therefore, would not be considered to have a significant, adverse air quality impact. Alternatively, individual project-related construction and operational emissions that exceed SCAQMD thresholds for project-specific impacts would be considered cumulatively considerable.

Construction Impacts

Project construction-source air pollutant emissions would not exceed the SCAQMD regional thresholds for any criteria pollutant after implementation of applicable mitigation measures. Therefore, the Project would not result in a cumulatively considerable significant impact with respect to construction activity.

Operational Impacts

Project operational-source emissions would not exceed applicable SCAQMD regional thresholds for any criteria pollutant. Therefore, the Project would not result in a cumulatively significant impact with respect to operational activity.

# 4 REFERENCES


1. **South Coast Air Quality Management District.** RULE 402. Nuisance. [Online] May 7, 1976. [Cited: September 17, 2013.] http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-402.pdf?sfvrsn=4.
2. **Urban Crossroads, Inc.** *Upland Colonies Traffic Impact Analysis.* 2018.
3. **South Coast Air Quality Management District.** RULE 1113. Architectural Coatings. [Online] http://www.aqmd.gov/rules/reg/reg11/r1113.pdf.
4. —. RULE 431.2. Sulfur Content of Liquid Fuels. [Online] http://www.aqmd.gov/rules/siprules/sr431-2.pdf.
5. —. RULE 403. Fugitive Dust. [Online] http://www.aqmd.gov/rules/reg/reg04/r403.pdf.
6. —. RULE 1186. PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations. [Online] http://www.aqmd.gov/rules/reg/reg11/r1186.pdf.
7. —. RULE 403. Fugitive Dust. [Online] http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf?sfvrsn=4.
8. —. Draft Staff Report: Proposed Amended Rules 1113- Architectural Coatings. [Online] November 2015. http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/current-activities-support-documents/2015_11_dsr_par1113.pdf?sfvrsn=2.
9. —. Southern California Air Basins. [Online] [Cited: November 13, 2013.] http://www.aqmd.gov/map/mapaqmd1.pdf.
10. **Environmental Protection Agency.** National Ambient Air Quality Standards (NAAQS). [Online] 1990. [Cited: November 13, 2013.] http://www.epa.gov/air/criteria.html.
11. **Air Resources Board.** California Ambient Air Quality Standards (CAAQS). [Online] 2009. [Cited: November 13, 2013.] http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm.
12. **South Coast Air Quality Management District.** Annual Air Quality Monitoring Network Plan. [Online] July 2016. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-monitoring-network-plan/annual-air-quality-monitoring-network-plan-v2.pdf?sfvrsn=2.
13. **Environmental Protection Agency.** Monitor Values Report. [Online] https://www.epa.gov/outdoor-air-quality-data/monitor-values-report.
14. **Air Resources Board.** Air Quality Standards and Area Designations. [Online] 2013. [Cited: September 17, 2014.] http://www.arb.ca.gov/desig/desig.htm.
15. **South Coast Air Quality Management District.** National Ambient Air Qualirt Standards (NAQS) and California Ambient Air Quality Standards (CAAQS) Attainment Status for South Coast Air Basin. *AQMD.* [Online] February 2016. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf?sfvrsn=2.
16. —. RULE 403. Fugitive Dust. [Online] http://www.aqmd.gov/rules/reg/reg04/r403.pdf.
17. **California Air Resources Board.** Ambient Air Quality Standards (AAQS). [Online] 2013. [Cited: April 6, 2015.] http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.
18. **Environmental Protection Agency.** Air Pollution and the Clean Air Act. [Online] [Cited: September 17, 2014.] http://www.epa.gov/air/caa/.
19. **Air Resources Board.** California Ambient Air Quality Standards (CAAQS). [Online] 2009. [Cited: September 17, 2014.] http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm.

20. **South Coast Air Quality Management District.** 2012 Air Quality Management Plan (AQMP). [Online] 2012. [Cited: September 17, 2014.] http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan.
21. **Professionals, Association of Environmental.** 2016 California Environmental Quality Act (CEQA) Statute and Guidelines. [Online] http://resources.ca.gov/ceqa/docs/2016_CEQA_Statutes_and_Guidelines.pdf.
22. **South Coast Air Quality Management District (SCAQMD).** SCAQMD Air Quality Significance Thresholds. [Online] http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.
23. **California Air Pollution Control Officers Association (CAPCOA).** California Emissions Estimator Model (CalEEMod). [Online] September 2016. www.caleemod.com.
24. **Lake Environmental.** US EPA Models. *Lake Environmental.* [Online] http://www.weblakes.com/download/us_epa.html.
25. **South Coast Air Quality Management District.** *Localized Significance Thresholds Methodology.* s.l. : South Coast Air Quality Managment District, 2003.
26. —. Fact Sheet fo Applying CalEEMod to Localized Significance Thresholds. [Online] http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf.
27. —. *Localized Significance Thresholds Methodology.* s.l. : South Coast Air Quality Managment District, 2003.
28. —. 2003 Air Quality Management Plan. [Online] 2003. http://www.aqmd.gov/aqmp/aqmd03aqmp.htm.
29. —. Final 2016 Air Quality Management Plan (AQMP). [Online] March 2017. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=11.
30. **Southern California Association of Governments.** 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy. [Online] April 2016. http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf.
31. **South coast Air Quality Management District.** CEQA Air Quality Handbook (1993). [Online] 1993. [Cited: November 13, 2013.] http://www.aqmd.gov/ceqa/oldhdbk.html.
32. **City of Upland.** *City of Upland General Plan.* 2015.
33. **South Coast Air Quality Management District.** RULE 402. Nuisance. [Online] May 7, 1976. [Cited: November 13, 2013.] http://www.aqmd.gov/rules/reg/reg04/r402.pdf.
34. **Goss, Tracy A and Kroeger, Amy.** White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution. [Online] South Coast Air Quality Management District, 2003. http://www.aqmd.gov/rules/ciwg/final_white_paper.pdf.

# 5 CERTIFICATION

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed Upland Colonies Project. The information contained in this air quality impact assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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### EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

### PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

### PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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# APPENDIX 2.1:

# STATE/FEDERAL ATTAINMENT STATUS OF CRITERIA POLLUTANTS

**TABLE 2-3**

National Ambient Air Quality Standards (NAAQS) Attainment Status - South Coast Air Basin

| Criteria Pollutant | Averaging Time | Designation[a] | Attainment Date[b] |
|---|---|---|---|
| **Ozone ($O_3$)** | (1979) **1-Hour** (0.12 ppm)[c] | Nonattainment ("extreme") | 2/26/2023 (revised deadline) |
| | (2015) **8-Hour** (0.070 ppm)[d] | Pending – Expect Nonattainment ("extreme") | Pending (beyond 2032) |
| | (2008) **8-Hour** (0.075 ppm)[d] | Nonattainment ("extreme") | 7/20/2032 |
| | (1997) **8-Hour** (0.08 ppm)[d] | Nonattainment ("extreme") | 6/15/2024 |
| **PM2.5**[e] | (2006) **24-Hour** (35 µg/m$^3$) | Nonattainment ("serious") | 12/31/2019 |
| | (2012) **Annual** (12.0 µg/m$^3$) | Nonattainment ("moderate") | 12/31/2021 |
| | (1997) **Annual** (15.0 µg/m$^3$) | Attainment (final determination pending) | 4/5/2015 (attained 2013) |
| **PM10**[f] | (1987) **24-hour** (150 µg/m$^3$) | Attainment (Maintenance) | 7/26/2013 (attained) |
| **Lead (Pb)**[g] | (2008) **3-Months Rolling** (0.15 µg/m$^3$) | Nonattainment (Partial) (Attainment determination to be requested) | 12/31/2015 |
| **CO** | (1971) **1-Hour** (35 ppm) | Attainment (Maintenance) | 6/11/2007 (attained) |
| | (1971) **8-Hour** (9 ppm) | Attainment (Maintenance) | 6/11/2007 (attained) |
| **$NO_2$**[h] | (2010) **1-Hour** (100 ppb) | Unclassifiable/Attainment | N/A (attained) |
| | (1971) **Annual** (0.053 ppm) | Attainment (Maintenance) | 9/22/1998 (attained) |
| **$SO_2$**[i] | (2010) **1-Hour** (75 ppb) | Designations Pending (expect Unclassifiable/Attainment) | N/A (attained) |
| | (1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm) | Unclassifiable/Attainment | 3/19/1979 (attained) |

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05 ; however, the Basin has not attained this standard and therefore has some continuing obligations with respect to the revoked standard; original attainment date was 11/15/2010; the revised attainment date is 2/6/23

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the revoked 1997 and revised 2008 ozone NAAQS until they are attained

e) The attainment deadline for the 2006 24-hour PM2.5 NAAQS was 12/31/15 for the former "moderate" classification; U.S.EPA approved reclassification to "serious," effective 2/12/16 with an attainment deadline of 12/31/2019; the 2012 (proposal year) annual PM2.5 NAAQS was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m$^3$; new annual designations were final 1/15/15, effective 4/15/15; on July 25, 2016 U.S. EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m$^3$) and 24-hour PM2.5 (65 µg/m$^3$) NAAQS, effective August 24, 2016

f) The annual PM10 NAAQS was revoked, effective 12/18/06; the 24-hour PM10 NAAQS deadline was 12/31/2006; the Basin's Attainment Re-designation Request and PM10 Maintenance Plan was approved by U.S. EPA on 6/26/13, effective 7/26/13

g) Partial Nonattainment designation – Los Angeles County portion of the Basin only for near-source monitors; expect to remain in attainment based on current monitoring data; attainment re-designation request pending

h) New 1-hour $NO_2$ NAAQS became effective 8/2/10, with attainment designations 1/20/12; annual $NO_2$ NAAQS retained

i) The 1971 annual and 24-hour SO2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO2 1-hour NAAQS; final area designations expected by 12/31/20 due to new source-specific monitoring requirements; Basin expected to be in attainment due to ongoing clean data

**TABLE 2-4**

National Ambient Air Quality Standards (NAAQS) Attainment Status
Coachella Valley Portion of the Salton Sea Air Basin

| Criteria Pollutant | Averaging Time | Designation[a] | Attainment Date[b] |
|---|---|---|---|
| **Ozone ($O_3$)** | (1979) **1-Hour** (0.12 ppm)[c] | Attainment | 11/15/2007 (attained 12/31/2013) |
| | (2015) **8-Hour** (0.070 ppm)[d] | Pending – Expect Nonattainment (Severe) | Pending |
| | (2008) **8-Hour** (0.075 ppm)[d] | Nonattainment (Severe-15) | 7/20/2027 |
| | (1997) **8-Hour** (0.08 ppm)[d] | Nonattainment (Severe-15) | 6/15/2019 |
| **PM2.5**[e] | (2006) **24-Hour** (35 µg/m$^3$) | Unclassifiable/Attainment | N/A (attained) |
| | (2012) **Annual** (12.0 µg/m$^3$) | Unclassifiable/Attainment | N/A (attained) |
| | (1997) **Annual** (15.0 µg/m$^3$) | Unclassifiable/Attainment | N/A (attained) |
| **PM10**[f] | (1987) **24-hour** (150 µg/m$^3$) | Nonattainment ("serious") | 12/31/2006 |
| **Lead (Pb)** | (2008) **3-Months Rolling** (0.15 µg/m$^3$) | Unclassifiable/Attainment | Unclassifiable/ Attainment |
| **CO** | (1971) **1-Hour** (35 ppm) | Unclassifiable/Attainment | N/A (attained) |
| | (1971) **8-Hour** (9 ppm) | Unclassifiable/Attainment | N/A (attained) |
| **$NO_2$**[g] | (2010) **1-Hour** (100 ppb) | Unclassifiable/Attainment | N/A (attained) |
| | (1971) **Annual** (0.053 ppm) | Unclassifiable/Attainment | N/A (attained) |
| **$SO_2$**[h] | (2010) **1-Hour** (75 ppb) | Designations Pending | N/A |
| | (1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm) | Unclassifiable/Attainment | Unclassifiable/ Attainment |

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011–2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, that included preliminary 2014 data

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained

e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m$^3$

f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Re-designation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley

g) New 1-hour $NO_2$ NAAQS became effective 8/2/10; attainment designations 1/20/12; annual $NO_2$ NAAQS retained

h) The 1971 Annual and 24-hour $SO_2$ NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 $SO_2$ 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

The current status of CAAQS attainment for the pollutants with State standards is presented in Table 2-5 for the Basin and the Riverside County portion of the SSAB (Coachella Valley).

**TABLE 2-5**

California Ambient Air Quality Standards (CAAQS) Attainment Status
*South Coast Air Basin and Coachella Valley portion of Salton Sea Air Basin*

| Pollutant | Averaging Time and Level[b] | Designation[a] | |
|---|---|---|---|
| | | South Coast Air Basin | Coachella Valley |
| **Ozone ($O_3$)** | **1-Hour** (0.09 ppm)[c] | Nonattainment | Nonattainment |
| | **8-Hour** (0.070 ppm)[d] | Nonattainment | Nonattainment |
| **PM2.5** | **Annual** (12.0 µg/m$^3$) | Nonattainment | Attainment |
| **PM10** | **24-Hour** (50 µg/m$^3$) | Nonattainment | Nonattainment |
| | **Annual** (20 µg/m$^3$) | Nonattainment | Nonattainment |
| **Lead (Pb)** | **30-Day Average** (1.5 µg/m$^3$) | Attainment | Attainment |
| **CO** | **1-Hour** (20 ppm) | Attainment | Attainment |
| | **8-Hour** (9.0 ppm) | Attainment | Attainment |
| **$NO_2$** | **1-Hour** (0.18 ppm) | Attainment | Attainment |
| | **Annual** (0.030 ppm) | Attainment | Attainment |
| **$SO_2$** | **1-Hour** (0.25 ppm) | Attainment | Attainment |
| | **24-Hour** (0.04 ppm) | Attainment | Attainment |
| **Sulfates** | **24-Hour** (25 µg/m$^3$) | Attainment | Attainment |
| **$H_2S$[c]** | **1-Hour** (0.03 ppm) | Unclassified | Unclassified [c)] |

a) CA State designations shown were updated by CARB in 2016, based on the 2013–2015 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events; Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) CA State standards, or CAAQS, for ozone, CO, $SO_2$, $NO_2$, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and $H_2S$ standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring $H_2S$ in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a State designation, but nonattainment is anticipated for the $H_2S$ CAAQS in at least part of the Coachella Valley

The 1979 federal 1-hour ozone standard (0.12 ppm) was revoked by the U.S. EPA and replaced by the 8-hour average ozone standard (0.08 ppm), effective June 15, 2005. However, the Basin and the former Southeast Desert Modified Air Quality Management Area (which included the Coachella Valley) had not attained the 1-hour federal ozone NAAQS by the attainment dates in 2010 and 2007, respectively, and, therefore, had continuing obligations under the former standard. On August 25, 2014, U.S. EPA

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# APPENDIX 3.1:

# CALEEMOD CONSTRUCTION (UNMITIGATED) EMISSIONS MODEL OUTPUTS

# Upland Colonies (Construction - Unmitigated)

**San Bernardino-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Winter

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase -

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Architectural Coating -

Vehicle Trips - Construction Run Only.

Woodstoves - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 3/23/2020 | 2/24/2020 |
| tblConstructionPhase | PhaseEndDate | 1/27/2020 | 12/30/2019 |
| tblConstructionPhase | PhaseEndDate | 3/11/2019 | 2/11/2019 |
| tblConstructionPhase | PhaseEndDate | 2/24/2020 | 1/27/2020 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/14/2019 |
| tblConstructionPhase | PhaseStartDate | 2/25/2020 | 1/28/2020 |
| tblConstructionPhase | PhaseStartDate | 3/12/2019 | 2/12/2019 |
| tblConstructionPhase | PhaseStartDate | 2/12/2019 | 1/15/2019 |
| tblConstructionPhase | PhaseStartDate | 1/28/2020 | 12/31/2019 |

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Winter

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblEnergyUse | LightingElect | 1,608.84 | 0.00 |
| tblEnergyUse | NT24E | 6,155.97 | 0.00 |
| tblEnergyUse | NT24NG | 6,030.00 | 0.00 |
| tblEnergyUse | T24E | 951.67 | 0.00 |
| tblEnergyUse | T24NG | 24,566.15 | 0.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 56.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 40,000.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |

| | | | |
|---|---|---|---|
| tblSolidWaste | SolidWasteGenerationRate | 77.49 | 0.00 |
| tblVehicleTrips | DV_TP | 11.00 | 0.00 |
| tblVehicleTrips | HO_TL | 8.70 | 0.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 0.00 |
| tblVehicleTrips | HS_TL | 5.90 | 0.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 0.00 |
| tblVehicleTrips | HW_TL | 14.70 | 0.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 0.00 |
| tblVehicleTrips | PB_TP | 3.00 | 0.00 |
| tblVehicleTrips | PR_TP | 86.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 0.00 |
| tblVehicleTrips | SU_TR | 8.62 | 0.00 |
| tblVehicleTrips | WD_TR | 9.52 | 0.00 |
| tblWater | IndoorWaterUseRate | 4,300,165.69 | 0.00 |
| tblWater | OutdoorWaterUseRate | 2,710,974.02 | 0.00 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9448 | 111.7549 | 28.6786 | 0.2385 | 20.3885 | 2.9700 | 23.3585 | 10.2131 | 2.7324 | 12.9455 | 0.0000 | 24,985.1206 | 24,985.1206 | 2.6313 | 0.0000 | 25,050.9020 |
| 2020 | 49.9076 | 14.1209 | 15.2065 | 0.0243 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,359.7959 | 2,359.7959 | 0.7186 | 0.0000 | 2,377.7600 |
| **Maximum** | **49.9076** | **111.7549** | **28.6786** | **0.2385** | **20.3885** | **2.9700** | **23.3585** | **10.2131** | **2.7324** | **12.9455** | **0.0000** | **24,985.1206** | **24,985.1206** | **2.6313** | **0.0000** | **25,050.9020** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9448 | 111.7549 | 28.6786 | 0.2385 | 8.0742 | 2.9700 | 11.0442 | 4.0156 | 2.7324 | 6.7481 | 0.0000 | 24,985.1206 | 24,985.1206 | 2.6313 | 0.0000 | 25,050.9020 |
| 2020 | 49.9076 | 14.1209 | 15.2065 | 0.0243 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,359.7959 | 2,359.7959 | 0.7186 | 0.0000 | 2,377.7600 |
| **Maximum** | **49.9076** | **111.7549** | **28.6786** | **0.2385** | **8.0742** | **2.9700** | **11.0442** | **4.0156** | **2.7324** | **6.7481** | **0.0000** | **24,985.1206** | **24,985.1206** | **2.6313** | **0.0000** | **25,050.9020** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **59.91** | **0.00** | **50.72** | **60.42** | **0.00** | **45.29** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/14/2019 | 5 | 10 | |
| 2 | Grading | Grading | 1/15/2019 | 2/11/2019 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 2/12/2019 | 12/30/2019 | 5 | 230 | |
| 4 | Paving | Paving | 12/31/2019 | 1/27/2020 | 5 | 20 | |
| 5 | Architectural Coating | Architectural Coating | 1/28/2020 | 2/24/2020 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 20**

**Acres of Grading (Grading Phase): 40**

**Acres of Paving: 0**

**Residential Indoor: 320,760; Residential Outdoor: 106,920; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Architectural Coating | Air Compressors | 1 | 8.00 | 78 | 0.48 |
| Site Preparation | Crawler Tractors | 4 | 8.00 | 212 | 0.43 |
| Grading | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Building Construction | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |

**Trips and VMT**

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Winter

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 5,000.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 24.00 | 7.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 20.1873 | 0.0000 | 20.1873 | 10.1597 | 0.0000 | 10.1597 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **20.1873** | **2.9687** | **23.1559** | **10.1597** | **2.7312** | **12.8909** | | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1066 | 0.0747 | 0.7388 | 1.8900e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 188.3485 | 188.3485 | 6.1800e-003 | | 188.5030 |
| **Total** | **0.1066** | **0.0747** | **0.7388** | **1.8900e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **188.3485** | **188.3485** | **6.1800e-003** | | **188.5030** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.8730 | 0.0000 | 7.8730 | 3.9623 | 0.0000 | 3.9623 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | 0.0000 | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **7.8730** | **2.9687** | **10.8417** | **3.9623** | **2.7312** | **6.6935** | **0.0000** | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1066 | 0.0747 | 0.7388 | 1.8900e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 188.3485 | 188.3485 | 6.1800e-003 | | 188.5030 |
| **Total** | **0.1066** | **0.0747** | **0.7388** | **1.8900e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **188.3485** | **188.3485** | **6.1800e-003** | | **188.5030** |

## 3.3 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.3693 | 0.0000 | 8.3693 | 3.5735 | 0.0000 | 3.5735 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **8.3693** | **1.8311** | **10.2004** | **3.5735** | **1.6846** | **5.2581** | | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.7495 | 66.4414 | 10.9603 | 0.1931 | 4.3754 | 0.2253 | 4.6006 | 1.1996 | 0.2155 | 1.4151 | | 20,488.6409 | 20,488.6409 | 1.2531 | | 20,519.9692 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **1.8382** | **66.5037** | **11.5760** | **0.1947** | **4.5430** | **0.2264** | **4.7694** | **1.2441** | **0.2165** | **1.4606** | | **20,645.5980** | **20,645.5980** | **1.2583** | | **20,677.0550** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.2640 | 0.0000 | 3.2640 | 1.3937 | 0.0000 | 1.3937 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | 0.0000 | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **3.2640** | **1.8311** | **5.0951** | **1.3937** | **1.6846** | **3.0783** | **0.0000** | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.7495 | 66.4414 | 10.9603 | 0.1931 | 4.3754 | 0.2253 | 4.6006 | 1.1996 | 0.2155 | 1.4151 | | 20,488.6409 | 20,488.6409 | 1.2531 | | 20,519.9692 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **1.8382** | **66.5037** | **11.5760** | **0.1947** | **4.5430** | **0.2264** | **4.7694** | **1.2441** | **0.2165** | **1.4606** | | **20,645.5980** | **20,645.5980** | **1.2583** | | **20,677.0550** |

## 3.4 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0264 | 0.8014 | 0.1885 | 1.8400e-003 | 0.0448 | 5.1100e-003 | 0.0499 | 0.0129 | 4.8900e-003 | 0.0178 | | 193.8643 | 193.8643 | 0.0150 | | 194.2403 |
| Worker | 0.1421 | 0.0997 | 0.9851 | 2.5200e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 251.1313 | 251.1313 | 8.2400e-003 | | 251.3373 |
| **Total** | **0.1684** | **0.9011** | **1.1736** | **4.3600e-003** | **0.3131** | **6.9100e-003** | **0.3200** | **0.0841** | **6.5500e-003** | **0.0906** | | **444.9957** | **444.9957** | **0.0233** | | **445.5776** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | 0.0000 | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | **0.0000** | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0264 | 0.8014 | 0.1885 | 1.8400e-003 | 0.0448 | 5.1100e-003 | 0.0499 | 0.0129 | 4.8900e-003 | 0.0178 | | 193.8643 | 193.8643 | 0.0150 | | 194.2403 |
| Worker | 0.1421 | 0.0997 | 0.9851 | 2.5200e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 251.1313 | 251.1313 | 8.2400e-003 | | 251.3373 |
| **Total** | **0.1684** | **0.9011** | **1.1736** | **4.3600e-003** | **0.3131** | **6.9100e-003** | **0.3200** | **0.0841** | **6.5500e-003** | **0.0906** | | **444.9957** | **444.9957** | **0.0233** | | **445.5776** |

## 3.5 Paving - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **0.0888** | **0.0623** | **0.6157** | **1.5800e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **156.9571** | **156.9571** | **5.1500e-003** | | **157.0858** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | 0.0000 | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | **0.0000** | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **0.0888** | **0.0623** | **0.6157** | **1.5800e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **156.9571** | **156.9571** | **5.1500e-003** | | **157.0858** |

## 3.5 Paving - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0553 | 0.5544 | 1.5300e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 152.0625 | 152.0625 | 4.5400e-003 | | 152.1760 |
| **Total** | **0.0819** | **0.0553** | **0.5544** | **1.5300e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **152.0625** | **152.0625** | **4.5400e-003** | | **152.1760** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | 0.0000 | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | **0.0000** | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0553 | 0.5544 | 1.5300e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 152.0625 | 152.0625 | 4.5400e-003 | | 152.1760 |
| **Total** | **0.0819** | **0.0553** | **0.5544** | **1.5300e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **152.0625** | **152.0625** | **4.5400e-003** | | **152.1760** |

## 3.6 Architectural Coating - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

## 3.6 Architectural Coating - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0184 | 0.1848 | 5.1000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 50.6875 | 50.6875 | 1.5100e-003 | | 50.7253 |
| **Total** | **0.0273** | **0.0184** | **0.1848** | **5.1000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **50.6875** | **50.6875** | **1.5100e-003** | | **50.7253** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | 0.0000 | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | **0.0000** | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

### 3.6 Architectural Coating - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0184 | 0.1848 | 5.1000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 50.6875 | 50.6875 | 1.5100e-003 | | 50.7253 |
| **Total** | **0.0273** | **0.0184** | **0.1848** | **5.1000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **50.6875** | **50.6875** | **1.5100e-003** | | **50.7253** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

## 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Unmitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Upland Colonies (Construction - Unmitigated)

**San Bernardino-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Summer

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase -

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Architectural Coating -

Vehicle Trips - Construction Run Only.

Woodstoves - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 3/23/2020 | 2/24/2020 |
| tblConstructionPhase | PhaseEndDate | 1/27/2020 | 12/30/2019 |
| tblConstructionPhase | PhaseEndDate | 3/11/2019 | 2/11/2019 |
| tblConstructionPhase | PhaseEndDate | 2/24/2020 | 1/27/2020 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/14/2019 |
| tblConstructionPhase | PhaseStartDate | 2/25/2020 | 1/28/2020 |
| tblConstructionPhase | PhaseStartDate | 3/12/2019 | 2/12/2019 |
| tblConstructionPhase | PhaseStartDate | 2/12/2019 | 1/15/2019 |
| tblConstructionPhase | PhaseStartDate | 1/28/2020 | 12/31/2019 |

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Summer

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblEnergyUse | LightingElect | 1,608.84 | 0.00 |
| tblEnergyUse | NT24E | 6,155.97 | 0.00 |
| tblEnergyUse | NT24NG | 6,030.00 | 0.00 |
| tblEnergyUse | T24E | 951.67 | 0.00 |
| tblEnergyUse | T24NG | 24,566.15 | 0.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 56.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 40,000.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |

| | | | |
|---|---|---|---|
| tblSolidWaste | SolidWasteGenerationRate | 77.49 | 0.00 |
| tblVehicleTrips | DV_TP | 11.00 | 0.00 |
| tblVehicleTrips | HO_TL | 8.70 | 0.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 0.00 |
| tblVehicleTrips | HS_TL | 5.90 | 0.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 0.00 |
| tblVehicleTrips | HW_TL | 14.70 | 0.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 0.00 |
| tblVehicleTrips | PB_TP | 3.00 | 0.00 |
| tblVehicleTrips | PR_TP | 86.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 0.00 |
| tblVehicleTrips | SU_TR | 8.62 | 0.00 |
| tblVehicleTrips | WD_TR | 9.52 | 0.00 |
| tblWater | IndoorWaterUseRate | 4,300,165.69 | 0.00 |
| tblWater | OutdoorWaterUseRate | 2,710,974.02 | 0.00 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9449 | 111.3305 | 27.4075 | 0.2438 | 20.3885 | 2.9700 | 23.3585 | 10.2131 | 2.7324 | 12.9455 | 0.0000 | 25,545.8099 | 25,545.8099 | 2.5341 | 0.0000 | 25,609.1625 |
| 2020 | 49.9076 | 14.1181 | 15.3267 | 0.0245 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,377.2461 | 2,377.2461 | 0.7192 | 0.0000 | 2,395.2261 |
| **Maximum** | **49.9076** | **111.3305** | **27.4075** | **0.2438** | **20.3885** | **2.9700** | **23.3585** | **10.2131** | **2.7324** | **12.9455** | **0.0000** | **25,545.8099** | **25,545.8099** | **2.5341** | **0.0000** | **25,609.1625** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9449 | 111.3305 | 27.4075 | 0.2438 | 8.0742 | 2.9700 | 11.0442 | 4.0156 | 2.7324 | 6.7481 | 0.0000 | 25,545.8099 | 25,545.8099 | 2.5341 | 0.0000 | 25,609.1625 |
| 2020 | 49.9076 | 14.1181 | 15.3267 | 0.0245 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,377.2461 | 2,377.2461 | 0.7192 | 0.0000 | 2,395.2261 |
| **Maximum** | **49.9076** | **111.3305** | **27.4075** | **0.2438** | **8.0742** | **2.9700** | **11.0442** | **4.0156** | **2.7324** | **6.7481** | **0.0000** | **25,545.8099** | **25,545.8099** | **2.5341** | **0.0000** | **25,609.1625** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **59.91** | **0.00** | **50.72** | **60.42** | **0.00** | **45.29** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/14/2019 | 5 | 10 | |
| 2 | Grading | Grading | 1/15/2019 | 2/11/2019 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 2/12/2019 | 12/30/2019 | 5 | 230 | |
| 4 | Paving | Paving | 12/31/2019 | 1/27/2020 | 5 | 20 | |
| 5 | Architectural Coating | Architectural Coating | 1/28/2020 | 2/24/2020 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 20**

**Acres of Grading (Grading Phase): 40**

**Acres of Paving: 0**

**Residential Indoor: 320,760; Residential Outdoor: 106,920; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Architectural Coating | Air Compressors | 1 | 8.00 | 78 | 0.48 |
| Site Preparation | Crawler Tractors | 4 | 8.00 | 212 | 0.43 |
| Grading | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Building Construction | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |

**Trips and VMT**

Upland Colonies (Construction - Unmitigated) - San Bernardino-South Coast County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 5,000.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 24.00 | 7.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 20.1873 | 0.0000 | 20.1873 | 10.1597 | 0.0000 | 10.1597 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **20.1873** | **2.9687** | **23.1559** | **10.1597** | **2.7312** | **12.8909** | | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1067 | 0.0710 | 0.8973 | 2.1100e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 209.9549 | 209.9549 | 7.0400e-003 | | 210.1309 |
| **Total** | **0.1067** | **0.0710** | **0.8973** | **2.1100e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **209.9549** | **209.9549** | **7.0400e-003** | | **210.1309** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.8730 | 0.0000 | 7.8730 | 3.9623 | 0.0000 | 3.9623 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | 0.0000 | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **7.8730** | **2.9687** | **10.8417** | **3.9623** | **2.7312** | **6.6935** | **0.0000** | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1067 | 0.0710 | 0.8973 | 2.1100e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 209.9549 | 209.9549 | 7.0400e-003 | | 210.1309 |
| **Total** | **0.1067** | **0.0710** | **0.8973** | **2.1100e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **209.9549** | **209.9549** | **7.0400e-003** | | **210.1309** |

## 3.3 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.3693 | 0.0000 | 8.3693 | 3.5735 | 0.0000 | 3.5735 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **8.3693** | **1.8311** | **10.2004** | **3.5735** | **1.6846** | **5.2581** | | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.6738 | 66.0202 | 9.5572 | 0.1982 | 4.3754 | 0.2215 | 4.5968 | 1.1996 | 0.2119 | 1.4115 | | 21,031.3249 | 21,031.3249 | 1.1553 | | 21,060.2064 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **1.7627** | **66.0794** | **10.3049** | **0.2000** | **4.5430** | **0.2226** | **4.7656** | **1.2441** | **0.2129** | **1.4570** | | **21,206.2873** | **21,206.2873** | **1.1611** | | **21,235.3154** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.2640 | 0.0000 | 3.2640 | 1.3937 | 0.0000 | 1.3937 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | 0.0000 | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **3.2640** | **1.8311** | **5.0951** | **1.3937** | **1.6846** | **3.0783** | **0.0000** | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.6738 | 66.0202 | 9.5572 | 0.1982 | 4.3754 | 0.2215 | 4.5968 | 1.1996 | 0.2119 | 1.4115 | | 21,031.3249 | 21,031.3249 | 1.1553 | | 21,060.2064 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **1.7627** | **66.0794** | **10.3049** | **0.2000** | **4.5430** | **0.2226** | **4.7656** | **1.2441** | **0.2129** | **1.4570** | | **21,206.2873** | **21,206.2873** | **1.1611** | | **21,235.3154** |

## 3.4 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0251 | 0.8060 | 0.1639 | 1.9100e-003 | 0.0448 | 5.0400e-003 | 0.0499 | 0.0129 | 4.8200e-003 | 0.0177 | | 201.6334 | 201.6334 | 0.0136 | | 201.9743 |
| Worker | 0.1423 | 0.0947 | 1.1964 | 2.8100e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 279.9398 | 279.9398 | 9.3900e-003 | | 280.1745 |
| **Total** | **0.1674** | **0.9007** | **1.3603** | **4.7200e-003** | **0.3131** | **6.8400e-003** | **0.3200** | **0.0841** | **6.4800e-003** | **0.0905** | | **481.5732** | **481.5732** | **0.0230** | | **482.1487** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | 0.0000 | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | **0.0000** | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0251 | 0.8060 | 0.1639 | 1.9100e-003 | 0.0448 | 5.0400e-003 | 0.0499 | 0.0129 | 4.8200e-003 | 0.0177 | | 201.6334 | 201.6334 | 0.0136 | | 201.9743 |
| Worker | 0.1423 | 0.0947 | 1.1964 | 2.8100e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 279.9398 | 279.9398 | 9.3900e-003 | | 280.1745 |
| **Total** | **0.1674** | **0.9007** | **1.3603** | **4.7200e-003** | **0.3131** | **6.8400e-003** | **0.3200** | **0.0841** | **6.4800e-003** | **0.0905** | | **481.5732** | **481.5732** | **0.0230** | | **482.1487** |

## 3.5 Paving - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **0.0889** | **0.0592** | **0.7477** | **1.7600e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **174.9624** | **174.9624** | **5.8700e-003** | | **175.1091** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | 0.0000 | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | **0.0000** | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **0.0889** | **0.0592** | **0.7477** | **1.7600e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **174.9624** | **174.9624** | **5.8700e-003** | | **175.1091** |

## 3.5 Paving - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0525 | 0.6746 | 1.7000e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 169.5126 | 169.5126 | 5.1700e-003 | | 169.6420 |
| **Total** | **0.0819** | **0.0525** | **0.6746** | **1.7000e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **169.5126** | **169.5126** | **5.1700e-003** | | **169.6420** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | 0.0000 | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | **0.0000** | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0525 | 0.6746 | 1.7000e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 169.5126 | 169.5126 | 5.1700e-003 | | 169.6420 |
| **Total** | **0.0819** | **0.0525** | **0.6746** | **1.7000e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **169.5126** | **169.5126** | **5.1700e-003** | | **169.6420** |

## 3.6 Architectural Coating - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

## 3.6 Architectural Coating - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0175 | 0.2249 | 5.7000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 56.5042 | 56.5042 | 1.7200e-003 | | 56.5473 |
| **Total** | **0.0273** | **0.0175** | **0.2249** | **5.7000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **56.5042** | **56.5042** | **1.7200e-003** | | **56.5473** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | 0.0000 | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | **0.0000** | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

### 3.6 Architectural Coating - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0175 | 0.2249 | 5.7000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 56.5042 | 56.5042 | 1.7200e-003 | | 56.5473 |
| **Total** | **0.0273** | **0.0175** | **0.2249** | **5.7000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **56.5042** | **56.5042** | **1.7200e-003** | | **56.5473** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

### 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

### 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

### 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

## 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Unmitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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# APPENDIX 3.2:

# CALEEMOD CONSTRUCTION (MITIGATED) EMISSIONS MODEL OUTPUT

# Upland Colonies (Construction - Mitigated)

**San Bernardino-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Winter

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase -

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Architectural Coating -

Vehicle Trips - Construction Run Only.

Woodstoves - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 HP are required to be equipped with Tier 3 or better engines.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Winter

| tblConstEquipMitigation | Tier | No Change | Tier 3 |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 3/23/2020 | 2/24/2020 |
| tblConstructionPhase | PhaseEndDate | 1/27/2020 | 12/30/2019 |
| tblConstructionPhase | PhaseEndDate | 3/11/2019 | 2/11/2019 |
| tblConstructionPhase | PhaseEndDate | 2/24/2020 | 1/27/2020 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/14/2019 |
| tblConstructionPhase | PhaseStartDate | 2/25/2020 | 1/28/2020 |
| tblConstructionPhase | PhaseStartDate | 3/12/2019 | 2/12/2019 |
| tblConstructionPhase | PhaseStartDate | 2/12/2019 | 1/15/2019 |
| tblConstructionPhase | PhaseStartDate | 1/28/2020 | 12/31/2019 |
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblEnergyUse | LightingElect | 1,608.84 | 0.00 |
| tblEnergyUse | NT24E | 6,155.97 | 0.00 |
| tblEnergyUse | NT24NG | 6,030.00 | 0.00 |
| tblEnergyUse | T24E | 951.67 | 0.00 |
| tblEnergyUse | T24NG | 24,566.15 | 0.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 56.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 40,000.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Winter

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblSolidWaste | SolidWasteGenerationRate | 77.49 | 0.00 |
| tblVehicleTrips | DV_TP | 11.00 | 0.00 |
| tblVehicleTrips | HO_TL | 8.70 | 0.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 0.00 |
| tblVehicleTrips | HS_TL | 5.90 | 0.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 0.00 |
| tblVehicleTrips | HW_TL | 14.70 | 0.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 0.00 |
| tblVehicleTrips | PB_TP | 3.00 | 0.00 |
| tblVehicleTrips | PR_TP | 86.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 0.00 |
| tblVehicleTrips | SU_TR | 8.62 | 0.00 |
| tblVehicleTrips | WD_TR | 9.52 | 0.00 |
| tblWater | IndoorWaterUseRate | 4,300,165.69 | 0.00 |
| tblWater | OutdoorWaterUseRate | 2,710,974.02 | 0.00 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |

| | | | |
|---|---|---|---|
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9448 | 111.7549 | 28.6786 | 0.2385 | 20.3885 | 2.9700 | 23.3585 | 10.2131 | 2.7324 | 12.9455 | 0.0000 | 24,985.1206 | 24,985.1206 | 2.6313 | 0.0000 | 25,050.9020 |
| 2020 | 49.9076 | 14.1209 | 15.2065 | 0.0243 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,359.7959 | 2,359.7959 | 0.7186 | 0.0000 | 2,377.7600 |
| **Maximum** | **49.9076** | **111.7549** | **28.6786** | **0.2385** | **20.3885** | **2.9700** | **23.3585** | **10.2131** | **2.7324** | **12.9455** | **0.0000** | **24,985.1206** | **24,985.1206** | **2.6313** | **0.0000** | **25,050.9020** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 2.9139 | 87.2992 | 36.0461 | 0.2385 | 8.0742 | 1.1916 | 9.1000 | 4.0156 | 1.1647 | 5.0413 | 0.0000 | 24,985.1206 | 24,985.1206 | 2.6313 | 0.0000 | 25,050.9020 |
| 2020 | 49.9076 | 14.1209 | 15.2065 | 0.0243 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,359.7959 | 2,359.7959 | 0.7186 | 0.0000 | 2,377.7600 |
| **Maximum** | **49.9076** | **87.2992** | **36.0461** | **0.2385** | **8.0742** | **1.1916** | **9.1000** | **4.0156** | **1.1647** | **5.0413** | **0.0000** | **24,985.1206** | **24,985.1206** | **2.6313** | **0.0000** | **25,050.9020** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **5.43** | **19.43** | **-16.79** | **0.00** | **59.91** | **47.76** | **58.73** | **60.42** | **45.76** | **57.76** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/14/2019 | 5 | 10 | |
| 2 | Grading | Grading | 1/15/2019 | 2/11/2019 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 2/12/2019 | 12/30/2019 | 5 | 230 | |
| 4 | Paving | Paving | 12/31/2019 | 1/27/2020 | 5 | 20 | |
| 5 | Architectural Coating | Architectural Coating | 1/28/2020 | 2/24/2020 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 20**

**Acres of Grading (Grading Phase): 40**

**Acres of Paving: 0**

**Residential Indoor: 320,760; Residential Outdoor: 106,920; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Architectural Coating | Air Compressors | 1 | 8.00 | 78 | 0.48 |
| Site Preparation | Crawler Tractors | 4 | 8.00 | 212 | 0.43 |
| Grading | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Building Construction | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 5,000.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 24.00 | 7.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 20.1873 | 0.0000 | 20.1873 | 10.1597 | 0.0000 | 10.1597 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **20.1873** | **2.9687** | **23.1559** | **10.1597** | **2.7312** | **12.8909** | | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1066 | 0.0747 | 0.7388 | 1.8900e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 188.3485 | 188.3485 | 6.1800e-003 | | 188.5030 |
| **Total** | **0.1066** | **0.0747** | **0.7388** | **1.8900e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **188.3485** | **188.3485** | **6.1800e-003** | | **188.5030** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.8730 | 0.0000 | 7.8730 | 3.9623 | 0.0000 | 3.9623 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3969 | 27.0067 | 30.2661 | 0.0569 | | 1.0244 | 1.0244 | | 1.0244 | 1.0244 | 0.0000 | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **1.3969** | **27.0067** | **30.2661** | **0.0569** | **7.8730** | **1.0244** | **8.8974** | **3.9623** | **1.0244** | **4.9867** | **0.0000** | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1066 | 0.0747 | 0.7388 | 1.8900e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 188.3485 | 188.3485 | 6.1800e-003 | | 188.5030 |
| **Total** | **0.1066** | **0.0747** | **0.7388** | **1.8900e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **188.3485** | **188.3485** | **6.1800e-003** | | **188.5030** |

## 3.3 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.3693 | 0.0000 | 8.3693 | 3.5735 | 0.0000 | 3.5735 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **8.3693** | **1.8311** | **10.2004** | **3.5735** | **1.6846** | **5.2581** | | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.7495 | 66.4414 | 10.9603 | 0.1931 | 4.3754 | 0.2253 | 4.6006 | 1.1996 | 0.2155 | 1.4151 | | 20,488.6409 | 20,488.6409 | 1.2531 | | 20,519.9692 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **1.8382** | **66.5037** | **11.5760** | **0.1947** | **4.5430** | **0.2264** | **4.7694** | **1.2441** | **0.2165** | **1.4606** | | **20,645.5980** | **20,645.5980** | **1.2583** | | **20,677.0550** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.2640 | 0.0000 | 3.2640 | 1.3937 | 0.0000 | 1.3937 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.0756 | 20.7955 | 24.4701 | 0.0438 | | 0.8142 | 0.8142 | | 0.8142 | 0.8142 | 0.0000 | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **1.0756** | **20.7955** | **24.4701** | **0.0438** | **3.2640** | **0.8142** | **4.0782** | **1.3937** | **0.8142** | **2.2079** | **0.0000** | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.7495 | 66.4414 | 10.9603 | 0.1931 | 4.3754 | 0.2253 | 4.6006 | 1.1996 | 0.2155 | 1.4151 | | 20,488.6409 | 20,488.6409 | 1.2531 | | 20,519.9692 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **1.8382** | **66.5037** | **11.5760** | **0.1947** | **4.5430** | **0.2264** | **4.7694** | **1.2441** | **0.2165** | **1.4606** | | **20,645.5980** | **20,645.5980** | **1.2583** | | **20,677.0550** |

## 3.4 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0264 | 0.8014 | 0.1885 | 1.8400e-003 | 0.0448 | 5.1100e-003 | 0.0499 | 0.0129 | 4.8900e-003 | 0.0178 | | 193.8643 | 193.8643 | 0.0150 | | 194.2403 |
| Worker | 0.1421 | 0.0997 | 0.9851 | 2.5200e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 251.1313 | 251.1313 | 8.2400e-003 | | 251.3373 |
| **Total** | **0.1684** | **0.9011** | **1.1736** | **4.3600e-003** | **0.3131** | **6.9100e-003** | **0.3200** | **0.0841** | **6.5500e-003** | **0.0906** | | **444.9957** | **444.9957** | **0.0233** | | **445.5776** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0280 | 23.5872 | 24.6905 | 0.0430 | | 1.1847 | 1.1847 | | 1.1581 | 1.1581 | 0.0000 | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **2.0280** | **23.5872** | **24.6905** | **0.0430** | | **1.1847** | **1.1847** | | **1.1581** | **1.1581** | **0.0000** | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0264 | 0.8014 | 0.1885 | 1.8400e-003 | 0.0448 | 5.1100e-003 | 0.0499 | 0.0129 | 4.8900e-003 | 0.0178 | | 193.8643 | 193.8643 | 0.0150 | | 194.2403 |
| Worker | 0.1421 | 0.0997 | 0.9851 | 2.5200e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 251.1313 | 251.1313 | 8.2400e-003 | | 251.3373 |
| **Total** | **0.1684** | **0.9011** | **1.1736** | **4.3600e-003** | **0.3131** | **6.9100e-003** | **0.3200** | **0.0841** | **6.5500e-003** | **0.0906** | | **444.9957** | **444.9957** | **0.0233** | | **445.5776** |

## 3.5 Paving - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **0.0888** | **0.0623** | **0.6157** | **1.5800e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **156.9571** | **156.9571** | **5.1500e-003** | | **157.0858** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | 0.0000 | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | **0.0000** | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0888 | 0.0623 | 0.6157 | 1.5800e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 156.9571 | 156.9571 | 5.1500e-003 | | 157.0858 |
| **Total** | **0.0888** | **0.0623** | **0.6157** | **1.5800e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **156.9571** | **156.9571** | **5.1500e-003** | | **157.0858** |

## 3.5 Paving - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0553 | 0.5544 | 1.5300e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 152.0625 | 152.0625 | 4.5400e-003 | | 152.1760 |
| **Total** | **0.0819** | **0.0553** | **0.5544** | **1.5300e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **152.0625** | **152.0625** | **4.5400e-003** | | **152.1760** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | 0.0000 | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | **0.0000** | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0553 | 0.5544 | 1.5300e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 152.0625 | 152.0625 | 4.5400e-003 | | 152.1760 |
| **Total** | **0.0819** | **0.0553** | **0.5544** | **1.5300e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **152.0625** | **152.0625** | **4.5400e-003** | | **152.1760** |

## 3.6 Architectural Coating - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

## 3.6 Architectural Coating - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0184 | 0.1848 | 5.1000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 50.6875 | 50.6875 | 1.5100e-003 | | 50.7253 |
| **Total** | **0.0273** | **0.0184** | **0.1848** | **5.1000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **50.6875** | **50.6875** | **1.5100e-003** | | **50.7253** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | 0.0000 | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | **0.0000** | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

### 3.6 Architectural Coating - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0184 | 0.1848 | 5.1000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 50.6875 | 50.6875 | 1.5100e-003 | | 50.7253 |
| **Total** | **0.0273** | **0.0184** | **0.1848** | **5.1000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **50.6875** | **50.6875** | **1.5100e-003** | | **50.7253** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Unmitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Upland Colonies (Construction - Mitigated)

**San Bernardino-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Summer

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase -

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Off-road Equipment -

Off-road Equipment - Hours are based on an 8-hour workday.

Grading -

Architectural Coating -

Vehicle Trips - Construction Run Only.

Woodstoves - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 HP are required to be equipped with Tier 3 or better engines.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Summer

| tblConstEquipMitigation | Tier | No Change | Tier 3 |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 3/23/2020 | 2/24/2020 |
| tblConstructionPhase | PhaseEndDate | 1/27/2020 | 12/30/2019 |
| tblConstructionPhase | PhaseEndDate | 3/11/2019 | 2/11/2019 |
| tblConstructionPhase | PhaseEndDate | 2/24/2020 | 1/27/2020 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/14/2019 |
| tblConstructionPhase | PhaseStartDate | 2/25/2020 | 1/28/2020 |
| tblConstructionPhase | PhaseStartDate | 3/12/2019 | 2/12/2019 |
| tblConstructionPhase | PhaseStartDate | 2/12/2019 | 1/15/2019 |
| tblConstructionPhase | PhaseStartDate | 1/28/2020 | 12/31/2019 |
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblEnergyUse | LightingElect | 1,608.84 | 0.00 |
| tblEnergyUse | NT24E | 6,155.97 | 0.00 |
| tblEnergyUse | NT24NG | 6,030.00 | 0.00 |
| tblEnergyUse | T24E | 951.67 | 0.00 |
| tblEnergyUse | T24NG | 24,566.15 | 0.00 |
| tblFireplaces | FireplaceDayYear | 25.00 | 0.00 |
| tblFireplaces | FireplaceHourDay | 3.00 | 0.00 |
| tblFireplaces | FireplaceWoodMass | 1,019.20 | 0.00 |
| tblFireplaces | NumberGas | 56.10 | 0.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | MaterialImported | 0.00 | 40,000.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | LoadFactor | 0.43 | 0.43 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 7.00 | 8.00 |
| tblSolidWaste | SolidWasteGenerationRate | 77.49 | 0.00 |
| tblVehicleTrips | DV_TP | 11.00 | 0.00 |
| tblVehicleTrips | HO_TL | 8.70 | 0.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 0.00 |
| tblVehicleTrips | HS_TL | 5.90 | 0.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 0.00 |
| tblVehicleTrips | HW_TL | 14.70 | 0.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 0.00 |
| tblVehicleTrips | PB_TP | 3.00 | 0.00 |
| tblVehicleTrips | PR_TP | 86.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 0.00 |
| tblVehicleTrips | SU_TR | 8.62 | 0.00 |
| tblVehicleTrips | WD_TR | 9.52 | 0.00 |
| tblWater | IndoorWaterUseRate | 4,300,165.69 | 0.00 |
| tblWater | OutdoorWaterUseRate | 2,710,974.02 | 0.00 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |

| | | | |
|---|---|---|---|
| tblWoodstoves | WoodstoveDayYear | 25.00 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 999.60 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 5.9449 | 111.3305 | 27.4075 | 0.2438 | 20.3885 | 2.9700 | 23.3585 | 10.2131 | 2.7324 | 12.9455 | 0.0000 | 25,545.8099 | 25,545.8099 | 2.5341 | 0.0000 | 25,609.1625 |
| 2020 | 49.9076 | 14.1181 | 15.3267 | 0.0245 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,377.2461 | 2,377.2461 | 0.7192 | 0.0000 | 2,395.2261 |
| **Maximum** | **49.9076** | **111.3305** | **27.4075** | **0.2438** | **20.3885** | **2.9700** | **23.3585** | **10.2131** | **2.7324** | **12.9455** | **0.0000** | **25,545.8099** | **25,545.8099** | **2.5341** | **0.0000** | **25,609.1625** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 2.8383 | 86.8749 | 34.7751 | 0.2438 | 8.0742 | 1.1915 | 9.1000 | 4.0156 | 1.1646 | 5.0413 | 0.0000 | 25,545.8099 | 25,545.8099 | 2.5341 | 0.0000 | 25,609.1625 |
| 2020 | 49.9076 | 14.1181 | 15.3267 | 0.0245 | 0.1677 | 0.7539 | 0.9216 | 0.0445 | 0.6936 | 0.7381 | 0.0000 | 2,377.2461 | 2,377.2461 | 0.7192 | 0.0000 | 2,395.2261 |
| **Maximum** | **49.9076** | **86.8749** | **34.7751** | **0.2438** | **8.0742** | **1.1915** | **9.1000** | **4.0156** | **1.1646** | **5.0413** | **0.0000** | **25,545.8099** | **25,545.8099** | **2.5341** | **0.0000** | **25,609.1625** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **5.56** | **19.49** | **-17.24** | **0.00** | **59.91** | **47.76** | **58.73** | **60.42** | **45.76** | **57.76** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/14/2019 | 5 | 10 | |
| 2 | Grading | Grading | 1/15/2019 | 2/11/2019 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 2/12/2019 | 12/30/2019 | 5 | 230 | |
| 4 | Paving | Paving | 12/31/2019 | 1/27/2020 | 5 | 20 | |
| 5 | Architectural Coating | Architectural Coating | 1/28/2020 | 2/24/2020 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 20**

**Acres of Grading (Grading Phase): 40**

**Acres of Paving: 0**

**Residential Indoor: 320,760; Residential Outdoor: 106,920; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Upland Colonies (Construction - Mitigated) - San Bernardino-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Architectural Coating | Air Compressors | 1 | 8.00 | 78 | 0.48 |
| Site Preparation | Crawler Tractors | 4 | 8.00 | 212 | 0.43 |
| Grading | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Excavators | 1 | 8.00 | 158 | 0.38 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Building Construction | Crawler Tractors | 3 | 8.00 | 212 | 0.43 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Paving | Paving Equipment | 2 | 8.00 | 132 | 0.36 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 247 | 0.40 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 5,000.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 24.00 | 7.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 5.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 20.1873 | 0.0000 | 20.1873 | 10.1597 | 0.0000 | 10.1597 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.8382 | 68.1103 | 23.1420 | 0.0569 | | 2.9687 | 2.9687 | | 2.7312 | 2.7312 | | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **5.8382** | **68.1103** | **23.1420** | **0.0569** | **20.1873** | **2.9687** | **23.1559** | **10.1597** | **2.7312** | **12.8909** | | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1067 | 0.0710 | 0.8973 | 2.1100e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 209.9549 | 209.9549 | 7.0400e-003 | | 210.1309 |
| **Total** | **0.1067** | **0.0710** | **0.8973** | **2.1100e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **209.9549** | **209.9549** | **7.0400e-003** | | **210.1309** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.8730 | 0.0000 | 7.8730 | 3.9623 | 0.0000 | 3.9623 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3969 | 27.0067 | 30.2661 | 0.0569 | | 1.0244 | 1.0244 | | 1.0244 | 1.0244 | 0.0000 | 5,636.7406 | 5,636.7406 | 1.7834 | | 5,681.3258 |
| **Total** | **1.3969** | **27.0067** | **30.2661** | **0.0569** | **7.8730** | **1.0244** | **8.8974** | **3.9623** | **1.0244** | **4.9867** | **0.0000** | **5,636.7406** | **5,636.7406** | **1.7834** | | **5,681.3258** |

## 3.2 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1067 | 0.0710 | 0.8973 | 2.1100e-003 | 0.2012 | 1.3500e-003 | 0.2026 | 0.0534 | 1.2500e-003 | 0.0546 | | 209.9549 | 209.9549 | 7.0400e-003 | | 210.1309 |
| **Total** | **0.1067** | **0.0710** | **0.8973** | **2.1100e-003** | **0.2012** | **1.3500e-003** | **0.2026** | **0.0534** | **1.2500e-003** | **0.0546** | | **209.9549** | **209.9549** | **7.0400e-003** | | **210.1309** |

## 3.3 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 8.3693 | 0.0000 | 8.3693 | 3.5735 | 0.0000 | 3.5735 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7079 | 45.2512 | 17.1026 | 0.0438 | | 1.8311 | 1.8311 | | 1.6846 | 1.6846 | | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **3.7079** | **45.2512** | **17.1026** | **0.0438** | **8.3693** | **1.8311** | **10.2004** | **3.5735** | **1.6846** | **5.2581** | | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.6738 | 66.0202 | 9.5572 | 0.1982 | 4.3754 | 0.2215 | 4.5968 | 1.1996 | 0.2119 | 1.4115 | | 21,031.3249 | 21,031.3249 | 1.1553 | | 21,060.2064 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **1.7627** | **66.0794** | **10.3049** | **0.2000** | **4.5430** | **0.2226** | **4.7656** | **1.2441** | **0.2129** | **1.4570** | | **21,206.2873** | **21,206.2873** | **1.1611** | | **21,235.3154** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 3.2640 | 0.0000 | 3.2640 | 1.3937 | 0.0000 | 1.3937 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.0756 | 20.7955 | 24.4701 | 0.0438 | | 0.8142 | 0.8142 | | 0.8142 | 0.8142 | 0.0000 | 4,339.5226 | 4,339.5226 | 1.3730 | | 4,373.8471 |
| **Total** | **1.0756** | **20.7955** | **24.4701** | **0.0438** | **3.2640** | **0.8142** | **4.0782** | **1.3937** | **0.8142** | **2.2079** | **0.0000** | **4,339.5226** | **4,339.5226** | **1.3730** | | **4,373.8471** |

## 3.3 Grading - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 1.6738 | 66.0202 | 9.5572 | 0.1982 | 4.3754 | 0.2215 | 4.5968 | 1.1996 | 0.2119 | 1.4115 | | 21,031.3249 | 21,031.3249 | 1.1553 | | 21,060.2064 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **1.7627** | **66.0794** | **10.3049** | **0.2000** | **4.5430** | **0.2226** | **4.7656** | **1.2441** | **0.2129** | **1.4570** | | **21,206.2873** | **21,206.2873** | **1.1611** | | **21,235.3154** |

## 3.4 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 3.6389 | 39.6094 | 19.1231 | 0.0430 | | 1.8139 | 1.8139 | | 1.6949 | 1.6949 | | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **3.6389** | **39.6094** | **19.1231** | **0.0430** | | **1.8139** | **1.8139** | | **1.6949** | **1.6949** | | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0251 | 0.8060 | 0.1639 | 1.9100e-003 | 0.0448 | 5.0400e-003 | 0.0499 | 0.0129 | 4.8200e-003 | 0.0177 | | 201.6334 | 201.6334 | 0.0136 | | 201.9743 |
| Worker | 0.1423 | 0.0947 | 1.1964 | 2.8100e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 279.9398 | 279.9398 | 9.3900e-003 | | 280.1745 |
| **Total** | **0.1674** | **0.9007** | **1.3603** | **4.7200e-003** | **0.3131** | **6.8400e-003** | **0.3200** | **0.0841** | **6.4800e-003** | **0.0905** | | **481.5732** | **481.5732** | **0.0230** | | **482.1487** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0280 | 23.5872 | 24.6905 | 0.0430 | | 1.1847 | 1.1847 | | 1.1581 | 1.1581 | 0.0000 | 4,181.0255 | 4,181.0255 | 1.1342 | | 4,209.3809 |
| **Total** | **2.0280** | **23.5872** | **24.6905** | **0.0430** | | **1.1847** | **1.1847** | | **1.1581** | **1.1581** | **0.0000** | **4,181.0255** | **4,181.0255** | **1.1342** | | **4,209.3809** |

## 3.4 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0251 | 0.8060 | 0.1639 | 1.9100e-003 | 0.0448 | 5.0400e-003 | 0.0499 | 0.0129 | 4.8200e-003 | 0.0177 | | 201.6334 | 201.6334 | 0.0136 | | 201.9743 |
| Worker | 0.1423 | 0.0947 | 1.1964 | 2.8100e-003 | 0.2683 | 1.8000e-003 | 0.2701 | 0.0711 | 1.6600e-003 | 0.0728 | | 279.9398 | 279.9398 | 9.3900e-003 | | 280.1745 |
| **Total** | **0.1674** | **0.9007** | **1.3603** | **4.7200e-003** | **0.3131** | **6.8400e-003** | **0.3200** | **0.0841** | **6.4800e-003** | **0.0905** | | **481.5732** | **481.5732** | **0.0230** | | **482.1487** |

## 3.5 Paving - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **0.0889** | **0.0592** | **0.7477** | **1.7600e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **174.9624** | **174.9624** | **5.8700e-003** | | **175.1091** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.4544 | 15.2441 | 14.6648 | 0.0228 | | 0.8246 | 0.8246 | | 0.7586 | 0.7586 | 0.0000 | 2,257.0025 | 2,257.0025 | 0.7141 | | 2,274.8548 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.4544** | **15.2441** | **14.6648** | **0.0228** | | **0.8246** | **0.8246** | | **0.7586** | **0.7586** | **0.0000** | **2,257.0025** | **2,257.0025** | **0.7141** | | **2,274.8548** |

## 3.5 Paving - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0889 | 0.0592 | 0.7477 | 1.7600e-003 | 0.1677 | 1.1300e-003 | 0.1688 | 0.0445 | 1.0400e-003 | 0.0455 | | 174.9624 | 174.9624 | 5.8700e-003 | | 175.1091 |
| **Total** | **0.0889** | **0.0592** | **0.7477** | **1.7600e-003** | **0.1677** | **1.1300e-003** | **0.1688** | **0.0445** | **1.0400e-003** | **0.0455** | | **174.9624** | **174.9624** | **5.8700e-003** | | **175.1091** |

## 3.5 Paving - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0525 | 0.6746 | 1.7000e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 169.5126 | 169.5126 | 5.1700e-003 | | 169.6420 |
| **Total** | **0.0819** | **0.0525** | **0.6746** | **1.7000e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **169.5126** | **169.5126** | **5.1700e-003** | | **169.6420** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.3566 | 14.0656 | 14.6521 | 0.0228 | | 0.7528 | 0.7528 | | 0.6926 | 0.6926 | 0.0000 | 2,207.7334 | 2,207.7334 | 0.7140 | | 2,225.5841 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3566** | **14.0656** | **14.6521** | **0.0228** | | **0.7528** | **0.7528** | | **0.6926** | **0.6926** | **0.0000** | **2,207.7334** | **2,207.7334** | **0.7140** | | **2,225.5841** |

## 3.5 Paving - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0819 | 0.0525 | 0.6746 | 1.7000e-003 | 0.1677 | 1.1000e-003 | 0.1688 | 0.0445 | 1.0100e-003 | 0.0455 | | 169.5126 | 169.5126 | 5.1700e-003 | | 169.6420 |
| **Total** | **0.0819** | **0.0525** | **0.6746** | **1.7000e-003** | **0.1677** | **1.1000e-003** | **0.1688** | **0.0445** | **1.0100e-003** | **0.0455** | | **169.5126** | **169.5126** | **5.1700e-003** | | **169.6420** |

## 3.6 Architectural Coating - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

## 3.6 Architectural Coating - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0175 | 0.2249 | 5.7000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 56.5042 | 56.5042 | 1.7200e-003 | | 56.5473 |
| **Total** | **0.0273** | **0.0175** | **0.2249** | **5.7000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **56.5042** | **56.5042** | **1.7200e-003** | | **56.5473** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 49.5574 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3229 | 2.2451 | 2.4419 | 3.9600e-003 | | 0.1479 | 0.1479 | | 0.1479 | 0.1479 | 0.0000 | 375.2641 | 375.2641 | 0.0291 | | 375.9904 |
| **Total** | **49.8803** | **2.2451** | **2.4419** | **3.9600e-003** | | **0.1479** | **0.1479** | | **0.1479** | **0.1479** | **0.0000** | **375.2641** | **375.2641** | **0.0291** | | **375.9904** |

### 3.6 Architectural Coating - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0273 | 0.0175 | 0.2249 | 5.7000e-004 | 0.0559 | 3.7000e-004 | 0.0563 | 0.0148 | 3.4000e-004 | 0.0152 | | 56.5042 | 56.5042 | 1.7200e-003 | | 56.5473 |
| **Total** | **0.0273** | **0.0175** | **0.2249** | **5.7000e-004** | **0.0559** | **3.7000e-004** | **0.0563** | **0.0148** | **3.4000e-004** | **0.0152** | | **56.5042** | **56.5042** | **1.7200e-003** | | **56.5473** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

# 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |
| Unmitigated | 3.5742 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | 0.0000 | 9.8045 | 9.8045 | 9.5600e-003 | 0.0000 | 10.0435 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.5742** | **0.0632** | **5.4632** | **2.9000e-004** | | **0.0300** | **0.0300** | | **0.0300** | **0.0300** | **0.0000** | **9.8045** | **9.8045** | **9.5600e-003** | **0.0000** | **10.0435** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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# APPENDIX 3.3:

# CALEEMOD OPERATIONAL EMISSIONS MODEL OUTPUT

# Upland Colonies (Operations)

**San Bernardino-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Grading -

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates based on information provided in the TIA by Urban Crossroads (2018)

Woodstoves - Rule 445

Upland Colonies (Operations) - San Bernardino-South Coast County, Winter

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 1.00 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/1/2019 |
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblFireplaces | NumberGas | 56.10 | 66.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 2.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 9.54 |
| tblVehicleTrips | SU_TR | 8.62 | 8.55 |
| tblVehicleTrips | WD_TR | 9.52 | 9.44 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Energy | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| Mobile | 1.3571 | 9.7888 | 16.3540 | 0.0600 | 4.5873 | 0.0563 | 4.6436 | 1.2276 | 0.0530 | 1.2807 | | 6,112.9572 | 6,112.9572 | 0.3426 | | 6,121.5230 |
| **Total** | **5.1191** | **11.4567** | **22.5000** | **0.0705** | **4.5873** | **0.2161** | **4.8034** | **1.2276** | **0.2128** | **1.4405** | **0.0000** | **8,171.2857** | **8,171.2857** | **0.3915** | **0.0376** | **8,192.2639** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Energy | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| Mobile | 1.3571 | 9.7888 | 16.3540 | 0.0600 | 4.5873 | 0.0563 | 4.6436 | 1.2276 | 0.0530 | 1.2807 | | 6,112.9572 | 6,112.9572 | 0.3426 | | 6,121.5230 |
| **Total** | **5.1191** | **11.4567** | **22.5000** | **0.0705** | **4.5873** | **0.2161** | **4.8034** | **1.2276** | **0.2128** | **1.4405** | **0.0000** | **8,171.2857** | **8,171.2857** | **0.3915** | **0.0376** | **8,192.2639** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/1/2019 | 5 | 1 | |

**Acres of Grading (Site Preparation Phase): 2**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Crawler Tractors | 0 | 8.00 | 212 | 0.43 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |

### Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 0 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Site Preparation - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

### 3.2 Site Preparation - 2019

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

## 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 1.3571 | 9.7888 | 16.3540 | 0.0600 | 4.5873 | 0.0563 | 4.6436 | 1.2276 | 0.0530 | 1.2807 | | 6,112.9572 | 6,112.9572 | 0.3426 | | 6,121.5230 |
| Unmitigated | 1.3571 | 9.7888 | 16.3540 | 0.0600 | 4.5873 | 0.0563 | 4.6436 | 1.2276 | 0.0530 | 1.2807 | | 6,112.9572 | 6,112.9572 | 0.3426 | | 6,121.5230 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |
| Total | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| NaturalGas Unmitigated | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 5532.45 | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| **Total** | | **0.0597** | **0.5099** | **0.2170** | **3.2500e-003** | | **0.0412** | **0.0412** | | **0.0412** | **0.0412** | | **650.8770** | **650.8770** | **0.0125** | **0.0119** | **654.7448** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 5.53245 | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| **Total** | | **0.0597** | **0.5099** | **0.2170** | **3.2500e-003** | | **0.0412** | **0.0412** | | **0.0412** | **0.0412** | | **650.8770** | **650.8770** | **0.0125** | **0.0119** | **654.7448** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Unmitigated | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.1281 | 1.0948 | 0.4659 | 6.9900e-003 | | 0.0885 | 0.0885 | | 0.0885 | 0.0885 | 0.0000 | 1,397.6471 | 1,397.6471 | 0.0268 | 0.0256 | 1,405.9526 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.7024** | **1.1580** | **5.9291** | **7.2800e-003** | | **0.1186** | **0.1186** | | **0.1186** | **0.1186** | **0.0000** | **1,407.4515** | **1,407.4515** | **0.0364** | **0.0256** | **1,415.9960** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.1281 | 1.0948 | 0.4659 | 6.9900e-003 | | 0.0885 | 0.0885 | | 0.0885 | 0.0885 | 0.0000 | 1,397.6471 | 1,397.6471 | 0.0268 | 0.0256 | 1,405.9526 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.7024** | **1.1580** | **5.9291** | **7.2800e-003** | | **0.1186** | **0.1186** | | **0.1186** | **0.1186** | **0.0000** | **1,407.4515** | **1,407.4515** | **0.0364** | **0.0256** | **1,415.9960** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# Upland Colonies (Operations)

**San Bernardino-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Grading -

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates based on information provided in the TIA by Urban Crossroads (2018)

Woodstoves - Rule 445

Upland Colonies (Operations) - San Bernardino-South Coast County, Summer

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 1.00 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/1/2019 |
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblFireplaces | NumberGas | 56.10 | 66.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 2.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 9.54 |
| tblVehicleTrips | SU_TR | 8.62 | 8.55 |
| tblVehicleTrips | WD_TR | 9.52 | 9.44 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Energy | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| Mobile | 1.5493 | 9.7333 | 18.6556 | 0.0651 | 4.5873 | 0.0559 | 4.6432 | 1.2276 | 0.0526 | 1.2803 | | 6,630.4174 | 6,630.4174 | 0.3397 | | 6,638.9103 |
| **Total** | **5.3113** | **11.4012** | **24.8016** | **0.0757** | **4.5873** | **0.2157** | **4.8030** | **1.2276** | **0.2124** | **1.4401** | **0.0000** | **8,688.7459** | **8,688.7459** | **0.3886** | **0.0376** | **8,709.6512** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Energy | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| Mobile | 1.5493 | 9.7333 | 18.6556 | 0.0651 | 4.5873 | 0.0559 | 4.6432 | 1.2276 | 0.0526 | 1.2803 | | 6,630.4174 | 6,630.4174 | 0.3397 | | 6,638.9103 |
| **Total** | **5.3113** | **11.4012** | **24.8016** | **0.0757** | **4.5873** | **0.2157** | **4.8030** | **1.2276** | **0.2124** | **1.4401** | **0.0000** | **8,688.7459** | **8,688.7459** | **0.3886** | **0.0376** | **8,709.6512** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/1/2019 | 5 | 1 | |

**Acres of Grading (Site Preparation Phase): 2**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Crawler Tractors | 0 | 8.00 | 212 | 0.43 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |

### Trips and VMT

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 0 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

### 3.2 Site Preparation - 2019

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.1210 | 0.0000 | 2.1210 | 0.2290 | 0.0000 | 0.2290 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.1210** | **0.0000** | **2.1210** | **0.2290** | **0.0000** | **0.2290** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | | **0.0000** |

## 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 1.5493 | 9.7333 | 18.6556 | 0.0651 | 4.5873 | 0.0559 | 4.6432 | 1.2276 | 0.0526 | 1.2803 | | 6,630.4174 | 6,630.4174 | 0.3397 | | 6,638.9103 |
| Unmitigated | 1.5493 | 9.7333 | 18.6556 | 0.0651 | 4.5873 | 0.0559 | 4.6432 | 1.2276 | 0.0526 | 1.2803 | | 6,630.4174 | 6,630.4174 | 0.3397 | | 6,638.9103 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |
| Total | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| NaturalGas Unmitigated | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 5532.45 | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| **Total** | | **0.0597** | **0.5099** | **0.2170** | **3.2500e-003** | | **0.0412** | **0.0412** | | **0.0412** | **0.0412** | | **650.8770** | **650.8770** | **0.0125** | **0.0119** | **654.7448** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Single Family Housing | 5.53245 | 0.0597 | 0.5099 | 0.2170 | 3.2500e-003 | | 0.0412 | 0.0412 | | 0.0412 | 0.0412 | | 650.8770 | 650.8770 | 0.0125 | 0.0119 | 654.7448 |
| **Total** | | **0.0597** | **0.5099** | **0.2170** | **3.2500e-003** | | **0.0412** | **0.0412** | | **0.0412** | **0.0412** | | **650.8770** | **650.8770** | **0.0125** | **0.0119** | **654.7448** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |
| Unmitigated | 3.7023 | 1.1580 | 5.9291 | 7.2800e-003 | | 0.1186 | 0.1186 | | 0.1186 | 0.1186 | 0.0000 | 1,407.4515 | 1,407.4515 | 0.0364 | 0.0256 | 1,415.9960 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.1281 | 1.0948 | 0.4659 | 6.9900e-003 | | 0.0885 | 0.0885 | | 0.0885 | 0.0885 | 0.0000 | 1,397.6471 | 1,397.6471 | 0.0268 | 0.0256 | 1,405.9526 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.7024** | **1.1580** | **5.9291** | **7.2800e-003** | | **0.1186** | **0.1186** | | **0.1186** | **0.1186** | **0.0000** | **1,407.4515** | **1,407.4515** | **0.0364** | **0.0256** | **1,415.9960** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.2716 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 3.1363 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.1281 | 1.0948 | 0.4659 | 6.9900e-003 | | 0.0885 | 0.0885 | | 0.0885 | 0.0885 | 0.0000 | 1,397.6471 | 1,397.6471 | 0.0268 | 0.0256 | 1,405.9526 |
| Landscaping | 0.1664 | 0.0632 | 5.4632 | 2.9000e-004 | | 0.0300 | 0.0300 | | 0.0300 | 0.0300 | | 9.8045 | 9.8045 | 9.5600e-003 | | 10.0435 |
| **Total** | **3.7024** | **1.1580** | **5.9291** | **7.2800e-003** | | **0.1186** | **0.1186** | | **0.1186** | **0.1186** | **0.0000** | **1,407.4515** | **1,407.4515** | **0.0364** | **0.0256** | **1,415.9960** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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# APPENDIX B:

# BIOLOGICAL RESOURCES ASSESSMENT

# GENERAL BIOLOGICAL RESOURCES ASSESSMENT

## UPLAND COLONIES 59

### UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA

**(Township 1 South, Range 7 West, Section 5)**
**(APN 1045-121-02)**

***Prepared for:***

**FH II, LLC**
**2151 E. Convention Center Way**
**Suite 100**
**Ontario, California 91764**

***Prepared by:***

**RCA Associates, Inc.**
**15555 Main Street, #D4-235**
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**Principal Investigators:**
**Randall Arnold, President and Principal Biologist**
**Blake Curran, Environmental Scientist/Biologist**
**Parker Smith, Biological Field Technician**

**Project: #2018-67**

**July 13, 2018**
**(Updated August 30, 2018)**

# TITLE PAGE

| | |
|---|---|
| **Date Report Written:** | **July 13, 2018 (Updated August 30, 2018)** |
| **Date Field Work Completed:** | **July 10, 2018** |
| **Report Title:** | **General Biological Resources Assessment** |
| **Assessor's Parcel Number:** | **1045-121-02** |
| **Prepared for:** | **FH II, LLC**<br>**2151 E. Convention Center Way, Suite 100**<br>**Ontario, California 91764** |
| **Principal Investigators:** | **Randall C. Arnold, Jr., Principal Biologist**<br>**Parker L. Smith, Biological Field Technician**<br>**Blake Curran, Environmental Scientist/Biologist** |
| **Contact Information:** | **Randall C. Arnold, Jr.**<br>**RCA Associates, Inc.**<br>**15555 Main Street, #D4-235**<br>**Hesperia, California 92345**<br>**(760) 596-0017**<br>rarnold@rcaassociatesllc.com<br>**www.rcaassociatesllc.com** |

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Appendix A – Tables and Figures

## 1.0 INTRODUCTION AND SUMMARY

Biological surveys were conducted on a parcel that is approximately 10-acre in size located north of East 15th Street in the City of Upland, San Bernardino County, California (Township 1 South, Range 7 West, Section 5, USGS Ontario, California Quadrangle, 1956) (Figures 1, 2, 3, and 4). Focused surveys were also performed for the burrowing owl. The property supports a buckwheat shrubland community consisting of California buckwheat (*Eriogonum fasciculatum*), prickly-pear (*Opuntia spp*.), deerweed (*Acmispon glaber*), California broomsage (*Lepidospartum squamatum*), California yerba santa (*Eriodictyon californicum*), and brome grasses (*Bromus sp.*) (Figure 3). The site does not appear to have been recently disturbed with native shrubs dominating the landscape.

As part of the environmental process, California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS) data sources were reviewed. Following the data review, surveys were performed on the site on July 10, 2018, during which the biological resources on the site and in the surrounding areas were documented by biologists from RCA Associates, Inc**. As part of the surveys, the property and adjoining areas including area of improvement were evaluated for the presence of native habitats which may support populations of sensitive wildlife species. The property and adjoining area were also evaluated for the presence of sensitive habitats including wetlands, vernal pools, riparian habitats, and jurisdictional areas.**

Based on data from USFWS, CDFW, and a search of the California Natural Diversity Database (CNDDB, 2017), there are thirty-seven sensitive species that have been documented in the general region within approximately five miles of the project site. Scientific nomenclature for this report is based on the following references: Hickman (1993), Munz (1974), Stebbins (2003), Sibley (2000) and Whitaker (1980). Tables 1 and 2 provides information on the various special status plants and animal species which occur in the area (Appendix A).

The proponent is proposing to use the parcel for building a residential community. The parcel will be split into approximately 57 lots that are 50 ft wide and 4,000 SF minimum.

## 2.0 EXISTING CONDITIONS

### 2.1 Environmental Setting

The property is approximately 10-acre located north of East 15th Street in the City of Upland, San Bernardino County, California (Township 1 South, Range 7 West, Section 5, USGS Ontario, California Quadrangle, 1956). The site does not show signs of being disturbed in the recent past, with native vegetation still dominating the landscape. A channel that is approximately 30 ft wide on the bottom is located within the project site that bisects in an east-west direction. The site is bordered on the north, east, and south by developed land while the continuation of the channel border the site to the west. The parcel has been enclosed with a chain-link fence.

### 2.2 Vegetation Communities

California buckwheat (*Eriogonum fasciculatum*), prickly-pear (*Opuntia spp*.), deerweed (*Acmispon glaber*), California broomsage (*Lepidospartum squamatum*), and California yerba santa (*Eriodictyon californicum*) are the dominant perennials and the dominant annuals include brome grasses *(Bromus sp.)*, annual bursage (*Ambrosia acanthicarpa*), and schismus (*Schismus barbatus*). On the northern border of the parcel there is a row of non-native trees that has since encroached on to the property from the golf course. Section 5.0 provides a more detailed discussion of the various plant species observed during the surveys.

### 2.3 Wildlife

The site is expected to support a variety of wildlife species on the site; however, only a few species were observed during the field investigations. Mammals observed on the site or which are expected to inhabit the site include cottontails (*Sylvilagus audubonii*) and California ground squirrel (*Otospermophilus beecheyi*). Coyotes (*Canis latrans*), which are very common in the region, also utilize the site during hunting activities.

Birds observed included ravens (*Corvus corax*), house finch (*Carpodacus mexicanus*), rock pigeon *(Columba livia*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), and white-crowned sparrow *(Zonotrichia leucophrys*). Section 5.0 provides a more detailed discussion of the various species observed during the surveys.

Reptiles observed during the survey include alligator lizard (*Elgaria sp.*), side-blotched lizard (*Uta stansburiana*), and western whiptail lizard (*Cnemidophorus tigris*). Table 2 provides a compendium of wildlife species.

### 2.4 Soils

The soil of the project site is composed of Soboba stony loamy sand, 2 to 9 percent slopes (100%). The sandy loam series are well drained and have moderately rapid permeability. The soil series onsite are not considered hydric per the U.S. Department of Agriculture (USDA) National List of Hydric Soils (USDA, 2018).

In addition, no sensitive habitats (e.g., sensitive species critical habitats, etc.) have been documented in the immediate area according to the CNDDB (2018) and none were observed during the field investigations. In addition, the basin which bisects the site may have surface connections with channels downstream which may be considered jurisdictional.

## 3.0 METHODOLOGIES

General biological surveys were conducted on July 10, 2018, during which biologists from RCA Associates, Inc initially walked meandering transects throughout the property site and adjoining areas. During the surveys, data was collected on the plant and animal species present on the site. All plants and animals detected during the surveys were recorded and are provided in Tables 1 & 2 (Appendix A). The property was also evaluated for the presence of habitats which might support sensitive species. Scientific nomenclature for this report is based on the following references: Hickman (1993), Munz (1974), Stebbins (2003), Sibley (2000), and Whitaker (1980). Following completion of the initial reconnaissance survey, protocol surveys were conducted for the burrowing owl as per agency requirements. Weather conditions consisted of wind speeds of 0 to 5 mph, temperatures in the mid 80's (°F) (AM) with mostly clear skies. The applicable methodologies are summarized below.

### 3.1 Plants

Plant species observed during the field survey were identified by visual characteristics and morphology in the field and recorded in a field notebook. Samples of unusual and less familiar plants were collected and returned to the lab for identification using taxonomical guides. Soil maps were used to identify areas of the site which may contain suitable soils to support sensitive plant species. A list of all species observed on the project site was compiled from the survey data (Appendix A, Table 2). The taxonomic nomenclature used in this study follows the California Native Plant Society (CNPS 2018).

### 3.2 Wildlife

Wildlife species detected during the field surveys were identified by sight, calls, tracks, scat, or other signs and were recorded in a field notebook. Field guides were used to assist with identification of species during surveys and included the Sibley Field Guide to Birds of Western North America (2017) and Burt and Grossenheider (1980) for mammals. Although common names of wildlife species are fairly well standardized, scientific names are used in this report and are provided in Appendix A for reference.

**Burrowing Owl:** A habitat assessment (Phase 1) was conducted for the burrowing owl in conjunction with the general biological surveys to determine if the site supports suitable habitat

for the species, July 10, 2018. Following completion of the habitat assessment, it was determined that the site does not support suitable habitat for the burrowing owl. Therefore, a focused survey (Phase II) does not need to be conducted for burrowing owls for the absence of occupiable (i.e., suitable) burrows which could potentially be utilized by owls. As part of the burrow survey, transects were walked throughout the site during which any suitable burrows were evaluated for owls and owl sign. Burrowing owls typically utilize burrows which have been excavated by other animals (squirrels, coyotes, foxes, dogs, etc.) since owls rarely dig their own burrows. CDFW protocol also requires surveys be conducted in the surrounding area out to a distance of about 500 feet; therefore, the zone of influence (ZOI) surveys were performed in the area surrounding the site. If present on a site, CDFW typically requires the owls to be passively relocated during the non-breeding season.

**Nesting Birds**

The project site contains some suitable nesting habitat for avian species. Nesting birds are protected under section 3503 of the CDFW code and/or the Migratory Bird Treaty Act (MBTA). A few common bird species were observed within the project area during the survey with ravens (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), Anna's hummingbird (*Calypte anna*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), and white-crowned sparrow (*Zonotrichia leucophrys*). All bird species observed are included in the faunal compendium in Appendix A, Table 3.

### 3.3 Riparian/Riverine Habitat and Jurisdictional Areas

Aerial photography was reviewed prior to conducting the field investigations on July 10, 2018. The aerial photographs were used to locate and inspect any potential natural drainage features and water bodies that may be considered riparian/riverine habitat or which may be under the jurisdiction of either the U.S. Army Corps of Engineers (USACE) and/or CDFW. In general, surface drainage features are typically indicated as blue-line streams on USGS maps, which are expected to exhibit evidence of water flow through the channel. Such areas are considered potentially riparian/riverine habitat and may be subject to State and federal regulatory authority as "Waters of the State" or "Waters" of the U.S. Riparian/riverine habitat is defined as lands which contain habitat dominated by trees, shrubs, persistent emergent, or emergent mosses and lichens,

which occur close to or which depend upon soil moisture from a nearby freshwater source, or areas with freshwater flow during all or a portion of the year.

## 4.0 LITERATURE SEARCH

As part of the environmental process, a search of the California Natural Diversity Database (CNDDB) search was performed. Based on this review, it was determined that twenty-nine special status species have been documented within the Ontario quad of the property. The following tables provide data on each special status species which has been documented in the area.

**Table 4-1: Federal and State Listed Species and State Species of Special Concern.**
E = Endangered; T = Threatened; SSC = Species of special concern; CNPS = California Native Plant Society; CNDDB = California Natural Diversity Data Base

| Name | Listing Status | Habitat Requirements | Presence/Absence |
|---|---|---|---|
| California glossy snake (*Arizona elegans occidentalis*) | Fed: None<br>State: None | range of scrub and grassland habitats | The site does not support suitable habitat for the species. |
| Coastal California gnatcatcher *(Polioptila californica californica*) | Fed: None<br>State: None | Coastal bluff scrub<br>Coastal scrub | The site does not support suitable habitat for the species. |
| Southern California legless lizard (*Anniella stebbinsi*) | Fed: None<br>State: None | Broadleaved upland forest<br>Chaparral<br>Coastal dunes<br>Coastal scrub | The site does not support suitable habitat for the species. |
| Plummer's mariposa-lily (*Calochortus plummerae*) | Fed: None<br>State: None | Chaparral<br>Cismontane woodland<br>Coastal scrub<br>Lower montane coniferous forest<br>Valley & foothill grassland | The site does not support suitable habitat for the species. |
| Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*) | Fed: None<br>State: None | Chaparral<br>Coastal scrub | The site does not support suitable habitat for the species. |
| San Bernardino kangaroo rat (*Chorizanthe xanti var. leucotheca*) | Fed: E<br>State: None | Coastal scrub | The site does not support suitable habitat for the species. |
| Slender-horned spineflower (*Dodecahema leptoceras*) | Fed: E<br>State: E | Chaparral<br>Cismontane woodland<br>Coastal scrub | The site does not support suitable habitat for the species. |
| Burrowing owl (*Athene cunicularia*) | Fed: None<br>State: None | Grasslands and desert habitats | The site does support suitable habitat for the species; however, no owl observed during field surveys. |

| | | | |
|---|---|---|---|
| Crotch bumble bee (*Bombus crotchii*) | Fed: None<br>State: None | Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum. | The site does support suitable habitat for the species; however, no bees observed during field surveys. |
| Swainson's hawk (*Buteo swainsoni*) | Fed: None<br>State: T | Riparian forest<br>Riparian woodland<br>Valley & foothill grassland | The site does support suitable habitat for the species; however, no raptors observed during field surveys. |
| Luck morning-glory (*Calystegia felix*) | Fed: None<br>State: None<br>Fed: None<br>State: None | Meadow & seep<br>Riparian scrub | The site does not support suitable habitat for the species. |
| California saw-grass (*Cladium californicum*) | Fed: None<br>State: None | Alkali marsh<br>Freshwater marsh<br>Meadow & seep<br>Wetland | The site does not support suitable habitat for the species. |
| California diplectronan caddisfly (*Diplectrona californica*) | Fed: None<br>State: None | Aquatic | The site does not support suitable habitat for the species. |
| Western mastiff bat (*Eumops perotis californicus*) | Fed: None<br>State: None | Chaparral<br>Cismontane woodland<br>Coastal scrub<br>Valley & foothill grassland | The site does support suitable habitat for the species; however, no bats observed during field surveys. |
| Mesa horkelia (*Horkelia cuneata var. puberula*) | Fed: None<br>State: None | Chaparral<br>Cismontane woodland<br>Coastal scrub | The site does not support suitable habitat for the species. |
| Western yellow bat (*Lasiurus xanthinus*) | Fed: None<br>State: None | Desert wash | The site does not support suitable habitat for the species. |
| California black rail (*Laterallus jamaicensis coturniculus*) | Fed: None<br>State: T | Brackish marsh<br>Freshwater marsh<br>Marsh & swamp<br>Salt marsh<br>Wetland | The site does not support suitable habitat for the species. |
| Robinson's pepper-grass (Lepidium virginicum var. robinsonii) | Fed: None<br>State: None | Chaparral<br>Coastal scrub | The site does support suitable habitat for the species; however, no pepper-grass observed during field surveys. |
| Pallid bat (*Antrozous pallidus*) | Fed: None<br>State: None | Deserts, grasslands, shrublands, woodlands and forests. | The site does support suitable habitat for the species; however, no bat observed during field surveys. |
| California muhly (*Muhlenbergia californica*) | Fed: None<br>State: None | Chaparral<br>Coastal scrub<br>Lower montane coniferous forest<br>Meadow & seep | The site does support suitable habitat for the species; however, no muhly observed during field surveys. |
| Prostrate vernal pool navarretia (*Navarretia prostrata*) | Fed: None<br>State: None | Coastal scrub<br>Meadow & seep<br>Valley & foothill grassland<br>Vernal pool | The site does not support suitable habitat for the species. |

| | | | |
|---|---|---|---|
| | | Wetland | |
| San Diego desert woodrat (*Neotoma lepida intermedia*) | Fed: None<br>State: None | Coastal scrub | The site does support suitable habitat for the species; however, no rodents observed during field surveys. |
| Big free-tailed bat (*Nyctinomops macrotis*) | Fed: None<br>State: None | Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths. | The site does support suitable habitat for the species; however, no bats observed during field surveys. |
| White rabbit-tobacco (*Pseudognaphalium leucocephalum*) | Fed: None<br>State: None | Chaparral<br>Cismontane woodland<br>Coastal scrub<br>Riparian woodland | The site does support suitable habitat for the species; however, no rabbit-tobacco observed during field surveys. |
| Salt spring checkerbloom (*Sidalcea neomexicana*) | Fed: None<br>State: None | Alkali playa<br>Chaparral<br>Coastal scrub<br>Lower montane coniferous forest<br>Mojavean desert scrub<br>Wetland | The site does not support suitable habitat for the species. |
| San Bernardino aster (*Symphyotrichum defoliatum*) | Fed: None<br>State: None | Cismontane woodland<br>Coastal scrub<br>Lower montane coniferous forest<br>Marsh & swamp<br>Meadow & seep<br>Valley & foothill grassland | The site does support suitable habitat for the species; however, no aster observed during field surveys. |
| Two-stripped gartersnake (*Thamnophis hammondii*) | Fed: None<br>State: None | Marsh & swamp<br>Riparian scrub<br>Riparian woodland<br>Wetland | The site does not support suitable habitat for the species. |
| Rigid fringepod (*Thysanocarpus rigidus*) | Fed: None<br>State: None | Pinon & juniper woodlands | The site does not support suitable habitat for the species. |
| Coast horned lizard (*Phrynosoma blainvillii*) | Fed: None<br>State: None | Desert scrub<br>Sandy washes | The site does support suitable habitat for the species; however, no coast horned lizard observed during field surveys. |

## 5.0 RESULTS

### 5.1 General Biological Resources

The site supports a buckwheat shrubland community which covers most of the property (Figure 5). Species present on the site included California buckwheat (*Eriogonum fasciculatum*), prickly-pear (*Opuntia spp.*), deerweed (*Acmispon glaber*), California yerba santa (*Eriodictyon californicum*), California broomsage (*Lepidospartum squamatum*), and brome grasses (*Bromus sp.*). Table 1 provides a compendium of all plants occurring on the site and/or in the immediate surrounding area.

Birds observed included ravens (*Corvus corax*), house finch (*Carpodacus mexicanus*), rock pigeon *(Columba livia*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), white-crowned sparrow *(Zonotrichia leucophrys*), and Anna's hummingbird *(Calypte anna*).

California ground squirrels (*Spermophilus beecheyi*) and cottontail (*Sylvilagus auduboni*) were observed on the site, however; coyotes are known to occur in the area and may traverse the site during hunting activities. Tables 1 and 2 (Appendix A) provides a compendium of the various plant and animal species identified during the field investigations and those common to the area. No distinct wildlife corridors were identified on the site or in the immediate area.

Reptiles common in the region which is expected to inhabit the site include alligator lizard (*Elgaria sp.*), side-blotched lizard (*Uta stansburiana*), and western whiptail lizard (*Cnemidophorus tigris*). Table 2 provides a compendium of wildlife species observed during the various surveys and those likely to occur in the area.

No sensitive habitats (e.g., wetlands, vernal pools, critical habitats for sensitive species, etc.) were observed on the site during the field investigations. However, the basin which bisects the site may have surface connections with channels downstream which may be considered jurisdictional. Refer to section 5.5 for a discussion of the basin.

## 5.3 Federal and State Listed Species

No federal or State-listed species were observed on the site or zone of influence during the field investigations nor are any listed species expected to inhabit the site.

## 5.4 Wildlife Species of Special Concern

**Sensitive Plants:** There are numerous plants that have been documented in the quad. As mentioned above, about twelve sensitive plants have been documented within Ontario quadrangle. However, the site does not support habitats typically associated with the sensitive plants know to occur in the region. Therefore, no sensitive plant species are expected to inhabit the site and the project is not expected to impact any sensitive species.

**Sensitive Wildlife:** Within the Devore quad there are multiple species that are of Special Concern; however, the site does not support habitats typically associated with most of the sensitive species in the region. The only sensitive species which could potentially occur on the site is the burrowing owl and no owls were detected during the focused surveys conducted on the site. In addition, the site is not expected to support any populations of any other sensitive wildlife species.

## 5.5 Jurisdictional Waters and Riparian Habitat

The United States Army Corps of Engineers (USACE) regulates discharges of dredged or fill material into waters of the United States, and the State of California also regulates waters of the State and streambeds under the prevue of regional water quality boards and CDFW jurisdiction. These waters include wetlands and non-wetland bodies of water that meet specific criteria. A basin bisects the middle of the parcel and water was observed during the field investigations conducted on July 10, 2018; however, the basin may have surface connections with channels downstream which may be considered jurisdictional. The basin area has been previously described as a basin in the drainage study conducted by Madole & Associates, Inc. (June 12, 2017). No riparian vegetation was observed in the channel (e.g., cottonwoods, willows, etc.) during the July 2018 surveys.

## 6.0 IMPACTS AND MITIGATION MEASURES

### 6.1 General Biological Resources

Future development of the site will impact the general biological resources present on the site and areas of improvement, and most of the vegetation will likely be removed during future construction activities. Wildlife will also be impacted by development activities and those species with limited mobility (i.e., small mammals and reptiles) will experience increases in mortality during the construction phase. There is potential for various nesting birds to utilize the shrubs within the project site. However, potential impacts to nesting birds can be eliminated or significantly reduced if vegetation suitable for nesting birds is removed outside of the nesting bird season. The nesting season for birds typically occurs from February 15$^{th}$ to August 31$^{st}$.

No sensitive habitats (e.g., wetlands, vernal pools, critical habitats for sensitive species, etc.) were observed on the site during the field investigations. The basin which bisects the site may have surface connections with channels downstream which may be considered jurisdictional.

### 6.2 Federal and State Listed and Species of Special Concern

No federal or State-listed species were observed on the site during the field investigations. In addition, there are no documented observations of these species either on the site or in the immediate area. As per CDFW protocol, the burrowing owl survey results are valid for only 30 days; therefore, CDFW may require a 30-day pre-construction survey be performed prior to any clearing/grading activities to determine if owls have moved on to the site since the July 11, 2018, surveys.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Future development activities are expected to result in the removal of vegetation from the 10-acre parcel; however, cumulative impacts to the general biological resources (plants and animals) in the surrounding area are expected to be negligible. This assumption is based on the presence of habitat on the site which is very common throughout the region. In addition, future development activities are not expected to have any impact on any State or Federal listed or State special status plant or animal species. In addition, burrowing owls do not inhabit the site and are not expected to be impacted given the absence of any suitable burrows. The following mitigation measures are recommended:

1. Pre-construction surveys for burrowing owls and nesting birds protected under the Migratory Bird Treaty Act and Section 3503 of the California Fish and Wildlife Code shall be conducted prior to the commencement of Project-related ground disturbance.
    a. Appropriate survey methods and timeframes shall be established, to ensure that chances of detecting the target species are maximized.
    b. In the event that listed species are encountered, authorization from the USFWS and CDFW must be obtained. If nesting birds are detected, avoidance measures shall be implemented to ensure that nests are not disturbed until after young have fledged.
    c. Pre-construction surveys shall encompass all areas within the potential footprint of disturbance for the project, as well as a reasonable buffer around these areas.

If any sensitive species are observed on the property during future activities, CDFW and USFWS (as applicable) should be contacted to discuss specific mitigation measures which may be required for the individual species. CDFW and USFWS are the only agencies which can grant authorization for the "take" of any sensitive species and can approve the implementation of any applicable mitigation measures.

## 8.0 BIBLIOGRAPHY


Baldwin, Bruce G, et. al.
2002. The Jepson Desert Manual. Vascular Plants of Southeastern California. University of California Press, Berkeley, CA.

Bureau of Land Management
January 2005. Final Environmental Impact Report and Statement for the West Mojave Plan. Vol. 1A.

California Burrowing Owl Consortium
1993. Burrowing Owl Survey Protocol and Mitigation Guidelines

California Department of Fish and Game
1990. California Wildlife: Volume 1 (Amphibians and Reptiles), Volume II (Birds), and Volume III (Mammals).

California Department of Fish and Game
2003. Mohave Ground Squirrel Survey Guidelines.

California Department of Fish and Game
2014. Rarefind 3 Natural Diversity Database. Habitat and Data Analysis Branch. Sacramento, CA.

California Department of Fish and Game
March 7, 2013. Staff Report on Burrowing Owl Mitigation. 34 pp.

California Native Plant Society
2001. Inventory of Rare and Endangered Plants of California (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA x + 388 pp.

Ehrlich, P., Dobkin., Wheye, D.
Birder's Handbook. A Field Guide to the Natural History of North American Birds. Simon & Schuster Building Rockefeller Center 1230 Avenue of the Americas. New York, New York 10020.

Hickman, James C.
The Jepson Manual Higher Plants of California. University of California Press. Berkeley, CA. 3rd Edition. 1996.

Jaeger, Edmund C.
1969. Desert Wild Flowers. Stanford University Press, Stanford, California. 321 pp.

Kays, R. W. & Wilson, D. E.
Mammals of North America. Princeton University Press, Princeton, New Jersey. 2002.

Munz, Philip A.
1974. A Flora of Southern California. University of California Press, Berkeley, California. 1086 pp.

Tugel, Arlene J., Woodruff, George A.
Soil Conservation Service, 1978. Soil Survey of San Bernardino County California, Mojave River Area.

Sibley, David Allen.
National Audubon Society. The Sibley guide to Birds. Alfred A Knopf, Inc. 2000.

Stebbins, Robert C.
A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Company. 2003.

U.S. Fish and Wildlife Service
2010 Desert Tortoise Survey Protocol.

Whitaker, John O.
The Audubon Society Field Guide to North American Mammals. Alfred A Knopf, Inc. 1980.

**CERTIFICATION**

I hereby certify that the statements furnished above and in the attached exhibits, presents the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Fieldwork conducted for this assessment was performed by Randall Arnold and other biologists under his direction. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

Date: 08/30/2018 Signed: Blake Curran

Blake Curran

Field Work Performed By: Randall Arnold
President and Principal Biologist

Field Work Performed By: Parker Smith
Field Biological Technician

Field Work Performed By: Blake Curran
Environmental Scientist/Biologist

# Appendix A

## Tables and Figures

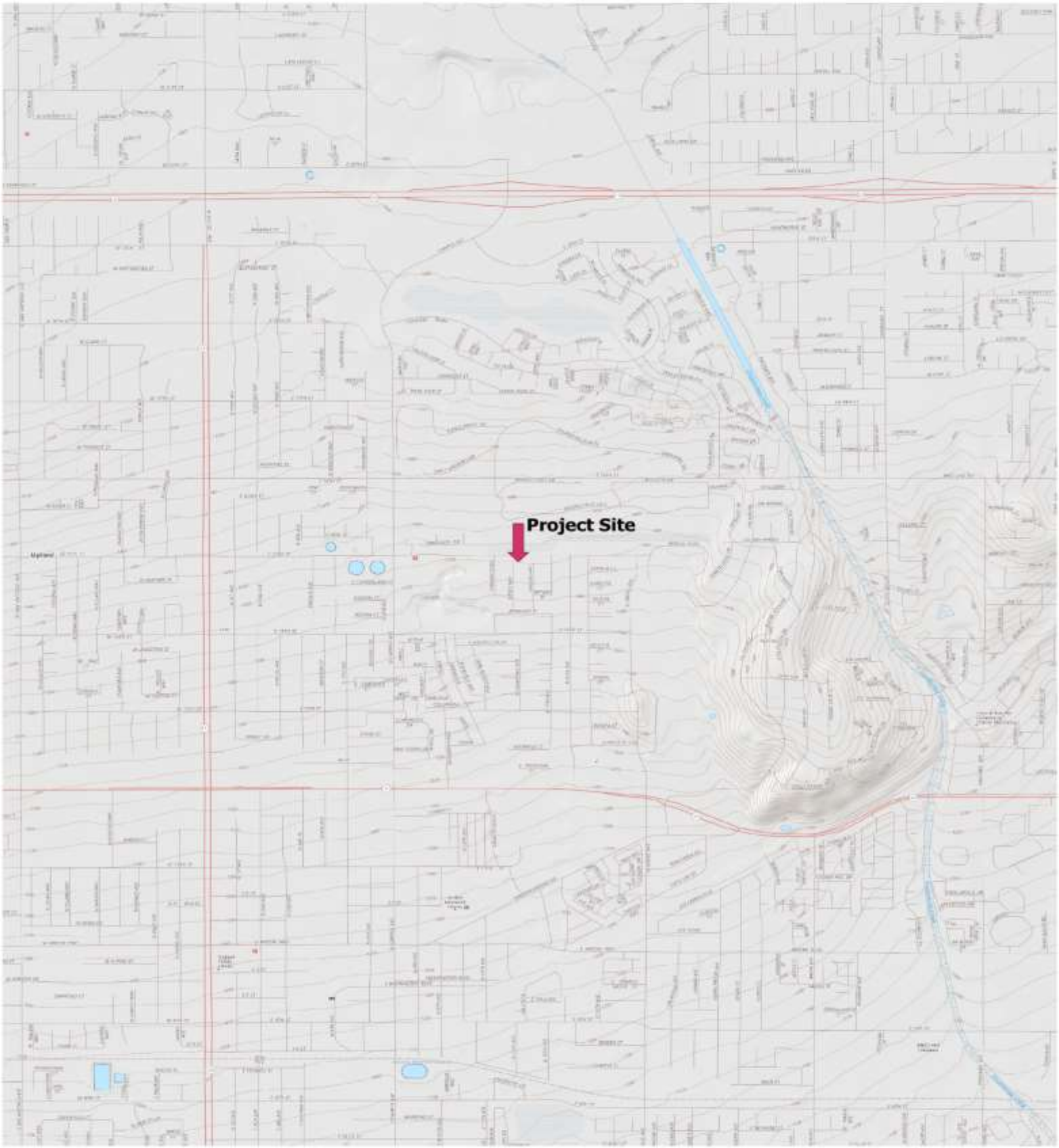
# Figure 1

Regional Vicinity Map



# Figure 2

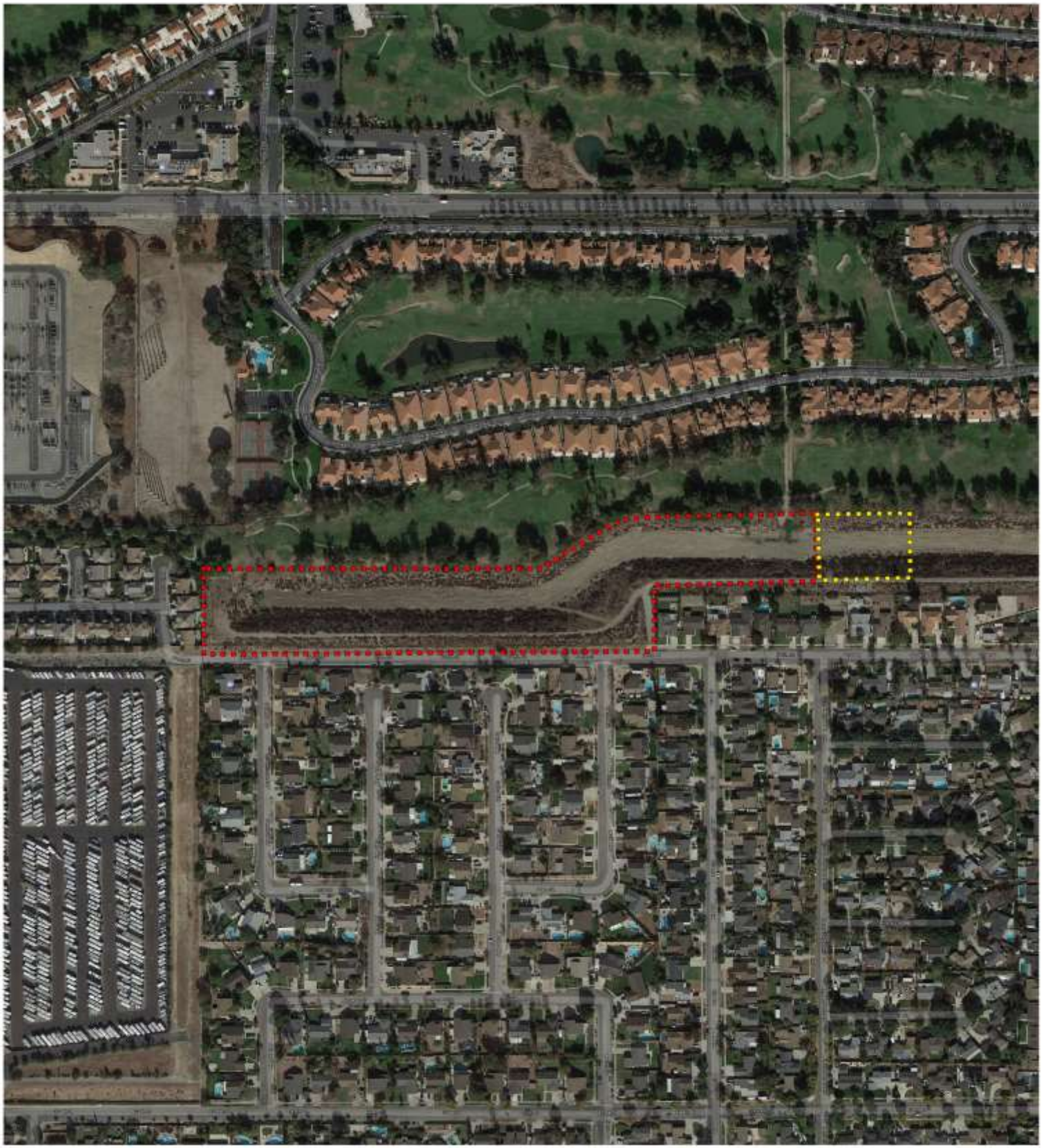
Topographic Map




RCA ASSOCIATES, INC

# Figure 3

Local Vicinity Map



75 0 75 150 225 m

Legend

Property Border

Area of Improvements

N

RCA ASSOCIATES, INC

# Figure 4

Site Plan




FEBRUARY 2, 2018

UPLAND COLONIES 59
FRONTIER COMMUNITIES

# Figure 5

Site Photographs



CENTER OF SITE LOOKING NORTH



CENTER OF SITE LOOKING EAST

# Figure 5 Cont.



CENTER OF SITE LOOKING WEST



LOOKING AT THE FLOWING WATER IN CHANNEL

**Table 1 - Plants observed on the site and known to occur in the immediate surrounding area.**

| Common Name | Scientific Name | Location |
|---|---|---|
| California buckwheat | *Eriogonum fasciculatum* | On site and Surrounding Area |
| Prickly-pear | *Opuntia spp.* | " |
| Deerweed | *Acmispon glaber* | " |
| California yerba santa | *Eriodictyon californicum* | " |
| California broomsage | *Lepidospartum squamatum* | " |
| Tree tobacco | *Nicotiana glauca* | " |
| Brome grass | *Bromus* sp. | " |
| Jimsonweed | *Datura stramonium* | " |
| Castor bean | *Ricinus communi* | " |
| Sahara mustard | *Brassica tournefortii* | " |
| Annual Bursage | *Ambrosia acanthicarpa* | " |
| Flat Topped Buckwheat | *Eriogonum deflexum* | " |
| Western tansymustard | *Descurainia pinnata* | " |
| Schismus | *Schismus barbatus* | " |
| Fiddleneck | *Amsinckia tessellata* | " |
| Filaree | *Erodium cicutarium* | " |
| Persian silk tree | *Albizia julibrissin* | " |
| Ash tree | *Fraxinus ssp.* | " |
| Brazilin pepper tree | *Schinus terebinthifolius* | " |
| Chinese elm | *Ulmus parvifolia* | " |
| Palm | *Arecaceae ssp.* | " |

Note: The above list is not intended to be a comprehensive list of every plant which may occur on the site or in the zone of influence.

**Table 2 - Wildlife observed on the site during the field investigations.**

| Common Name | Scientific Name | Location |
|---|---|---|
| Common raven | *Corvus corax* | On-site and in the surrounding area. |
| California ground squirrel | *Spermophilus beecheyi* | " |
| House sparrow | *Passer domesticus* | " |
| House finch | *Carpodacus mexicanus* | " |
| Northern mockingbird | *Mimus polyglottus* | " |
| Mourning dove | *Zenaida macroura* | " |
| Turkey vulture | *Cathertes aura* | On site and surrounding area |
| Red-tailed Hawk | *Buteo jamaicensis* | " |
| Western whiptail lizard | *Cnemidophorus tigris* | " |
| Alligator lizard | *Elgaria sp.* | |
| Side-blotched lizard | *Uta stansburiana* | " |
| Spiny lizard | *Sceloporus sp.* | " |
| Desert cottontail | *Sylvilagus auduboni* | " |
| Coyotes | *Canis latrans* | " |

Note: The above Table is not a comprehensive list of every animal species which may occur in the area, but is a list of those common species which were identified on the site or which have been observed in the region by biologists from RCA Associates, Inc.

## REGULATORY CONTEXT

The following provides a summary of federal and state regulatory jurisdiction over biological and wetland resources. Although most of these regulations do not directly apply to the site, given the general lack of sensitive resource, they provide important background information.

### Federal Endangered Species Act

The USFWS has jurisdiction over federally listed threatened and endangered plant and animal species. The federal Endangered Species Act (ESA) and its implementing regulations prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA. ESA defines "take" as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Federal regulation 50CFR17.3 defines the term "harass" as an intentional or negligent act that creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering (50CFR17.3). Furthermore, federal regulation 50CFR17.3 defines "harm" as an act that either kills or injures a listed species. By definition, "harm" includes habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavior patterns such as breeding, spawning, rearing, migrating, feeding, or sheltering (50CFR217.12).

Section10(a) of the ESA establishes a process for obtaining an incidental take permit that authorizes nonfederal entities to incidentally take federally listed wildlife or fish. Incidental take is defined by ESA as take that is "incidental to, and not the purpose of, the carrying out of another wise lawful activity." Preparation of a habitat conservation plan, generally referred to as an HCP, is required for all Section 10(a) permit applications. The USFWS and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) have joint authority under the ESA for administering the incidental take program. NOAA Fisheries Service has jurisdiction over anadromous fish species and USFWS has jurisdiction over all other fish and wildlife species.

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any species listed under the ESA, or result in the destruction or adverse modification of its habitat. Federal agencies are also required

to minimize impacts to all listed species resulting from their actions, including issuance or permits or funding. Section 7 requires consideration of the indirect effects of a project, effects on federally listed plants, and effects on critical habitat (ESA requires that the USFWS identify critical habitat to the maximum extent that it is prudent and determinable when a species is listed as threatened or endangered). This consultation results in a Biological Opinion prepared by the USFWS stating whether implementation of the HCP will result in jeopardy to any HCP Covered Species or will adversely modify critical habitat and the measures necessary to avoid or minimize effects to listed species.

Although federally listed animals are legally protected from harm no matter where they occur, the Section 9 of the ESA provides protection for endangered plants by prohibiting the malicious destruction on federal land and other "take" that violates State law. Protection for plants not living on federal lands is provided by the California Endangered Species Act.

**California Endangered Species Act**

CDFW has jurisdiction over species listed as threatened or endangered under Section 2080 of the California Fish and Wildlife Code. Section 2080 prohibits the take of a species listed by CDFW as threatened or endangered. The state definition of take is similar to the federal definition, except that Section 2080 does not prohibit indirect harm to listed species by way of habitat modification. To qualify as take under the state ESA, an action must have direct, demonstrable detrimental effect on individuals of the species. Impacts on habitat that may ultimately result in effects on individuals are not considered take under the state ESA but can be considered take under the federal ESA.

Proponents of a project affecting a state-listed species must consult with CDFW and enter into a management agreement and take permit under Section 2081. The state ESA consultation process is similar to the federal process. California ESA does not require preparation of a state biological assessment; the federal biological assessment and the CEQA analysis or any other relevant information can provide the basis for consultation. California ESA requires that CDFW coordinate consultation for joint federally listed and state-listed species to the extent possible; generally, the state opinion for the listed species is brief and references provisions under the federal opinion.

**Clean Water Act, Section 404**

The COE and the U.S. Environmental Protection Agency regulate the placement of dredged or fill material into "Waters of the United States" under Section 404 of the Clean Water Act. Waters of the United States include lakes, rivers, streams, and their tributaries, and wetlands. Wetlands are defined for regulatory purposes as "areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 Code of Federal Regulations [CFR] 328.3, 40 CFR 230.3).

The COE may issue either individual permits on a case-by-case basis or general permits on a program level. General permits are pre-authorized and are issued to cover similar activities that are expected to cause only minimal adverse environmental effects. Nationwide permits (NWP's) are general permits issued to cover particular fill activities. All NWP's have general conditions that must be met for the permits to apply to a particular project, as well as specific conditions that apply to each NWP.

**Clean Water Act, Section 401**

Section 401 of the Clean Water Act requires water quality certification and authorization of placement of dredged or fills material in wetlands and Other Waters of the United States. In accordance with Section 401 of the Clean Water Act, criteria for allowable discharges into surface waters have been developed by the State Water Resources Control Board, Division of Water Quality. As such, proponents of any new project which may impair water quality as a result of the project are required to create a post construction storm water management plan to insure offsite water quality is not degraded. The resulting requirements are used as criteria in granting National Pollution Discharge Elimination System (NPDES) permits or waivers, which are obtained through the Central Valley Regional Water Quality Control Board (RWQCB). Any activity or facility that will discharge waste (such as soils from construction) into surface waters, or from which waste may be discharged, must obtain an NPDES permit or waiver from the RWQCB. The RWQCB evaluates an NPDES permit application to determine whether the proposed discharge is consistent with the adopted water quality objectives of the basin plan.

**California Fish and Wildlife Code, Sections 1600-1616**

Under the California Fish and Wildlife Code, Sections1600-1616 CDFW regulates projects that divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake. Proponents of such projects must notify CDFW and enter into streambed alteration agreement with them.

Section 1602 of the California Fish and Wildlife Code requires a state or local government agency, public utility, or private entity to notify CDFW before it begins a construction project that will: (1) divert, obstruct, or change the natural flow or the bed, bank, channel, or bank of any river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. Once the notification is filed and determined to be complete, CDFW issues a streambed alteration agreement that contains conditions for construction and operations of the proposed project.

**California Fish and Wildlife Code, Section 3503.5**

Under the California Fish and Wildlife Code, Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes (hawks, eagles, and flacons) or Strigiformes (owls). Take would include the disturbance of an active nest resulting in the abandonment or loss of young.

**Migratory Bird Treaty Act**

The federal Migratory Bird Treaty Act (MBTA) prohibits the taking, hunting, killing, selling, purchasing, etc. of migratory birds, parts of migratory birds, or their eggs and nests. As used in the MBTA, the term "take" is defined as "to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires." Most bird species native to North America are covered by this act.

**Sensitive Natural Communities**

The California Office of Planning and Research and the Office of Permit Assistance (1986) define project effects that substantially diminish habitat for fish, wildlife, or plants, or that disrupt or divide the physical arrangement of an established community as significant impacts under CEQA. This definition applies to certain natural communities because of their scarcity and ecological

values and because the remaining occurrences are vulnerable to elimination. For this study, the term "sensitive natural community" includes those communities that, if eliminated or substantially degraded, would sustain a significant adverse impact as defined under CEQA. Sensitive natural communities are important ecologically because their degradation and destruction could threaten populations of dependent plant and wildlife species and significantly reduce the regional distribution and viability of the community. If the number and extent of sensitive natural communities continue to diminish, the status of rare, threatened, or endangered species could become more precarious, and populations of common species (i.e., not special status species) could become less viable. Loss of sensitive natural communities also can eliminate or reduce important ecosystem functions, such as water filtration by wetlands and bank stabilization by riparian woodlands for example.

# APPENDIX C:

# CULTURAL RESOURCES ASSESSMENT

# Phase I Cultural Resources Assessment For a Proposed Commercial Development On a 10-acre Site in the City of Upland, San Bernardino County, California

## (Township 1 South, Range 7 West, Section 5, Mt. Baldy, California USGS 7.5' Quadrangle)

*Prepared for:*

**Frontier Communities**

*Prepared by:*
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**Randall C. Arnold, Jr.**

**Project: #2018-68**

**Type of Study: Phase 1 Cultural Resources Survey, Upland, San Bernardino County, Negative Report, Serrano, Cahuilla**

**July 16, 2018**

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## EXECUTIVE SUMMARY

RCA Associates, Inc. was contracted by Frontier Communities to conduct a Cultural Resources Survey for the proposed single-family home development that is situated on a 10-acre site in the City of Upland, APNs (1045-151-34), (1045-121-02), (0207-483-46) (Township 1 South, Range 7 West, Section 5, Mt. Baldy, CA USGS 7.5' Quadrangle) (Figures 1 and 2). The study was performed pursuant to the California Environmental Quality Act (CEQA). A cultural resources records search, field survey, shovel-test pits and Native American consultation and coordination were all elements of this project and were included within the Scope of Work. Native American individuals and tribal groups were contacted by email and letter for their input. These communications and the outreach are provided in Appendix B. Field survey investigations were conducted on July 12, 2018 by RCA Associates, Inc. and did not result in the identification of any new cultural resources, including prehistoric or historic archaeological sites or buildings, structures or objects within the project boundaries. A cultural resources record search was conducted at the South Central Coastal Information Center (SCCIC) on June 26, 2018 which did not identify cultural resources within the Project area. Two cultural resources surveys have been previously conducted within the Project area, however, no cultural resources had been previously recorded within the project boundaries. Seven cultural resources studies have been completed within a half-mile radius (buffer) of the Project. Three historic and prehistoric cultural resources have been previously recorded within a half-mile radius surrounding the project area.

The Native American Heritage Commission (NAHC) was contacted regarding the project and they completed a Sacred Lands File Search, which yielded negative results for Sacred Lands in the Project. The NAHC also provided a list of potentially interested and affiliated Native American individuals and groups. All of these parties identified by the NAHC were contacted for further information and potential concerns regarding cultural resources within the project area.

Ms. Jessica Mauck, Cultural Resources Analyst of San Manuel Band of Mission Indians (SMBMI), advised that the project is within the Serrano ancestral territory and overlaps with that of the Gabrieleno groups of the west. SMBMI expressed little concern regarding this project area. The Gabrieleno Band of Mission Indians- Kizh Nation replied via email to express their interest in the project and would like to consult with the lead agency.

If previously undocumented cultural resources are identified during construction activities, a qualified archaeologist must be contacted to assess the nature and significance of the find. Construction activities shall be diverted. If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of the origin and disposition of the remains pursuant to Public Resources Code Section 5097.98. The County Coroner must also be notified of the find immediately. If the remains are determined to be prehistoric or protohistoric

Native American in origin, the Coroner will notify the NAHC. The NAHC shall determine and notify a Most Likely Descendant (MLD) that will consult with the Project Archaeologist and recommend the manner of treatment and disposition for any human remains and associated offerings.

## INTRODUCTION

RCA Associates, Inc. is under contract with Frontier Communities to conduct a Phase 1 Cultural Resources Survey of the proposed commercial development on a ten-acre property located in the City of Upland, California, APNs (1045-151-34) (1045-121-02) (0207-483-46) (Township 1 South, Range 7 West, Section 5) Mt. Baldy, California USGS 7.5' Quadrangle. This study was performed pursuant to the California Environmental Quality Act (CEQA).

The California Environmental Quality Act (CEQA) requires consideration of project impacts on archaeological or historical sites deemed to be "historical resources." Under CEQA, a substantial adverse change in the significant qualities of a historical resource is considered a significant effect on the environment. For the purposes of CEQA, a "historical resource" is a resource listed, or determined to be eligible for listing, in the California Register of Historical Resources [Title 14 CCR §15064.5(a)(1)-(3)]. Historical resources may include, but are not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" [PRC §5020.1(j)].

The eligibility criteria for the California Register are the definitive characteristics for assessing the significance of historical resources for purposes of CEQA (Office of Historic Preservation). Generally, a resource is considered "historically significant" if it meets one or more of the following criteria for listing on the California Register:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

## NATURAL SETTING

The project area is located immediately south of the Transverse Ranges and just west of the mouth of Cajon Pass. The Transverse Ranges are a California geomorphic province represented by a series of mountain ranges that trend in an east-west direction for about 300 miles. The range is often deemed a means of separating Central from Southern California. These Transverse Ranges connect with the Coast Ranges to the west and to the Sierra Nevada chain to the north.

The Mojave Desert lays to the north and east. Finally, the trough of the Salton Sea and the Colorado Desert and Peninsular Ranges are situated to the south. The Transverse Ranges incorporate a number of individually, distinctive mountain ranges – the Santa Ynez, Santa Monica, San Gabriel, San Bernardino, Eagle and the Oricopia mountains, just to identify some. The natural flora of the Transverse Ranges is described as a mixed chamise-chaparral plant community. Chaparral is a plant community of dense brush found on steep, rocky slopes. The dominant plants found in this vegetation zone include manzanita, chamise, scrub oak, and ceonothus.

The Mojave Desert incorporates an immense area of eastern California covering 31,000 square miles. This northern desert interfaces with the Sonoran Desert to the south and the Yuma Desert to the southeast. It is separated from the Great Basin along the Garlock Fault that traverses the base of the El Paso Mountains. Throughout the Mojave Desert there exists numerous broad playas or dry lake beds that drain internally. These playas can become shallow ephemeral lakes when occasional heavy rains fall. However, in general, the Mojave Desert is a water impoverished region with only four to 13 inches of rain annually. In Death Valley, in certain years, virtually no measurable rainfall appears (less than one inch of precipitation annually). Temperatures vary greatly in the Mojave Desert but summers can be exceedingly hot - with the highest ground temperature ever recorded on earth posted for Death Valley at 134 degrees Fahrenheit. However, night-time temperatures drop dramatically and snow fall occurs regularly at higher elevations.

The Mojave Desert characteristically exhibits large land areas containing the grey-green shrubs of the creosote bush (*Larrea tridentata*). Other areas exhibiting alkaline soils contain expressions of saltbush (*Atriplex* spp.). Plant species present in the general vicinity of the Project site include: juniper (*Juniperus californica*), annual bursage (*Ambrosia acanthicarpa),* Nevada jointfir (*Ephedra nevadensis*), bladder sage (*Scutellaria mexicana*), rabbitbrush (*Ericameria nauseosa*), and Joshua tree (*Yucca brevifolia*). Other plants noted in the general vicinity include saltbush (*Atriplex* sp.), schismus (*Schismus barbatus*), cholla (*Cylindropuntia echinocarpa),* bunchgrass (*Phleum pratense*), white bursage (*Ambrosia dumosa)*, California buckwheat (*Ambrosia dumosa),* and brome grasses *(Bromus sp.)*.

Typical Mojave Desert fauna include: bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), jackrabbit (*Lepus californicus*), cottontail, coyote, pronghorn, various reptiles (including the venomous Mohave rattlesnake and the notable chuckwalla) and rodents. Other animals include various species of waterfowl and numerous birds.

A biological resources assessment report was prepared for the site and submitted under separate cover.

## CULTURAL SETTING

### Prehistory

Synthetic treatments of the prehistory of the Mojave Desert are found in a number of academic references. The latter sources include topical treatments in Basgall (1993), Basgall and Hall (1994), Basgall et al. (1988), Bettinger and Taylor (1974), Garfinkel (2007), Garfinkel and Williams (2011, 2015), Garfinkel et al. (2010), Gilreath and Hildebrandt (1997), Grayson (2011), Lengner (2013), Schneider et al. (2000), Sutton et al. (2007), Ugan and Rosenthal (2015), Van Tilburg et al. (2012), Warren (1984), Warren and Crabtree (1986), Whitley (1998), Ugan and Rosenthal (2015) and Yohe (1992).

Research into the prehistory of the Mojave Desert has a lengthy pedigree. Perhaps some of the earliest scientific investigations were those conducted by the husband-wife team of William and Elizabeth Campbell working out of the Southwest Museum (Campbell 1931; Campbell and Campbell 1935; Campbell et al. 1935). During this same general time period Malcolm Rogers was conducting studies through his association with the San Diego Museum of Man. His research emphasized the identification of the flaked stone artifacts and prehistoric cultures mainly found in the Colorado Desert but overlapping the Mojave Desert as well (Rogers 1939). Another very early researcher in the area was Mark Raymond Harrington. Harrington conducted archaeological studies at the Stahl Site, Stahl Site Cave and Fossil Falls sites in the Coso Range while engaged by the Southwest Museum (1948a, 1948b, 1949, 1950, 1951, 1952, 1953, 1957).

In the 1960's Edward Lanning working with the University of California, Berkeley and wrote up the previous research completed at Rose Spring (CA-INY-372) in the Coso Range and this work served as a critical benchmark and anchor to develop the regional chronology. Robert Yohe returned to the site much later and provided an even more detailed and well-supported chronology bolstered by a suite of precise radiocarbon dates for this physically and culturally stratified site (Yohe 1992).

Perhaps the most intensive early studies were at China Lake completed by Emma Lou Davis. Her work continued from the 1960s into the mid to late 1970s and included intensive surface explorations and pioneering geo-archaeological research (Davis 1978). Although her assertions of very early pre-Clovis age occupations have been widely rejected, her multidisciplinary methods have provided well-grounded insights on late Pleistocene and early Holocene aboriginal land use. Excavations at China Lake also uncovered fluted points in putative association with burned; extinct megafaunal remains (Davis 1978). However, recent reassessments (Basgall 2007a, 2007b; Garfinkel et al. 2008) of Davis' findings failed to support the idea that artifacts and megafaunal bones were consistently related or that aboriginal activity is contemporaneous with extinct megafauna.

Much of the scholarly research in the Mojave Desert has been completed under the umbrella of cultural resource management studies. Many federal and state agencies (Bureau of Land Management, California Department of Transportation, California Department of Parks and Recreation, and United States Department of Forests) and private developers (relating to the construction of renewable energy initiatives employing both solar and wind) have been the major proponents and financial underwriters for these investigations.

The Mojave Desert has seen more archaeological study than perhaps many other areas of California. It has also spawned some of the most contentious dialogues in professional archaeology with respect to competing models attempting to illuminate the nature and antiquity of various prehistoric cultural manifestations. The focus of these debates relates to the nature and timing of various cultural transformations. Such discussions hinge on the age and character of technological shifts, settlement-subsistence change, economic developments, artistic and ideological transitions, prehistoric population movements / replacements and various reconstruction of linguistic prehistory (cf. Garfinkel 2006, 2007; Garfinkel and Austin 2011; Garfinkel et al. 2007, 2009, 2010; Grant et al. 1968; Goldsmith and Garfinkel 2013; Gilreath 2007; Gilreath and Hildebrandt 2008, 2011; Hedges 2001; Hildebrandt and McGuire 2002; McGuire and Hildebrandt 2005; Stewart et al. 2005; Van Tilburg et al. 2012; Whitley 1987, 1998, 2003; Whitley and Dorn 1987, 2011). Given the central importance of chronological controls, the prehistoric cultural sequence and related temporal periods remain an important and salient topic for continuing research.

## Cultural Sequence

### *Late Pleistocene: Paleo-Indian / Western Clovis Period*

Basally-fluted, projectile points of the Clovis (aka Western Clovis) cultural complex are generally considered to be the most dominant, hallmark of prehistoric occupation during the Late Pleistocene era. These Clovis points and their associated cultural materials have been the focus of intensive study and the general consensus is that they date from about 13,500 to 12,500 calibrated radiocarbon years (cal) before present (BP). Some researchers have tried to pinpoint the duration of the Clovis tradition to an even more exacting and narrower time span (12,800 to 13,200 cal BP) but recent critiques of that perspective support the notion that at least a millennium of time was necessary for the wide-ranging Clovis tradition to have developed and spread within the continental United States (cf. Goebel et al. 2008; Waters and Stafford 2007).

Until recently, the Clovis complex was considered to be the basement cultural expression in the Americas. However, reports from sites like Monte Verde (Chile), Paisley Cave (Oregon), the Schaefer and Hebior sites (Wisconsin), Meadowcroft Shelter (Pennsylvania), Page-Ladson (Florida), and the Debra L. Friedkin Site (Texas), have now provided substantial and persuasive evidence for pre-Clovis occupation dating to a period from about ca. 16,000 and 14,000 cal BP,

the latter archaeological complex having occurred some two to three thousand years before Clovis (Gilbert et al. 2008; Goebel et al. 2008; Waters et al. 2011b).

Unfortunately, as of yet, there is no tangible and compelling evidence within California or the Great Basin for such early pre-Clovis discoveries. Yet, there have been a number of claims (Davis 1978; Leakey et al. 1968) based on heavily weathered and crude cobble and core tools as part of a pre-projectile point tradition (cf. Moratto 1984:29-73). However, such claims have not withstood the test of time.

Nevertheless, although the Mojave Desert has posted early claims of great human antiquity, even Clovis-like fluted points discoveries themselves are fairly rare (cf. Rondeau et al. 2007). When such finds are identified they are most frequently isolates and typically found in association with now dry Pleistocene lakebeds. Besides the limited discoveries of fluted points, we have little in the way of related diagnostic elements of Clovis technology that would provide a more complete picture of the entire archaeological assemblage. Complementary artifacts, such as prismatic blades and cores and bone tools are commonly described from the Clovis heartland in the American Southwest and Plains (however cf. Fenenga 2015).

Further, there is long-standing ambiguity in the age and sequence of terminal Pleistocene cultural complexes in eastern California and the Great Basin generally. Some researchers have expressed doubts as to whether the Clovis Complex per se has a temporally or geographically extensive presence in California and the Great Basin. Further, some researchers question the true antiquity of these putative earliest California and Great Basin projectile point forms. Finally, other confounding issues remain with respect to the chronological relationship of one point type to another (e.g. Western Fluted vs. Concave Base vs. Western Stemmed).

China Lake Basin and the adjacent Rose Valley are home to some of the largest concentrations of fluted and concave base points in California. The sites in Rose Valley are located on relict terraces of the Lower Pleistocene Owens River. The Rose Valley sites were initially recognized and studied by Ferris Borden and the Archaeological Survey Association (Borden 1971; Moratto et al. 2018). The China Lake sites were researched by Emma Lou Davis (Davis 1978). A number of the fluted and unfluted concave base points discovered in the Coso Basin have yielded putatively ancient obsidian hydration dates that would provide a tentative late Pleistocene age determination (cf. Garfinkel et al. 2008; Moratto et al. 2018). Yet, no direct and associated radiocarbon determinations exist that demonstrate the age of these early points and there are only a handful (n = 4) of radiocarbon determinations dating to the Clovis age for any archaeological expressions in all of prehistoric California.

Nevertheless, recent obsidian hydration data provides a growing number of very large hydration rim measurements (greater than 16.0 microns) from several sites in the China Lake Basin and vicinity. These hydration measurements do support an age for both Western Fluted and Basally

Thinned Concave Base points dating to a time from about 12,000 to 13,500 cal BP. (Giambastiani and Bullard 2010; Rogers 2011; Garfinkel and Hopkins 2008; Garfinkel et al. 2016; Moratto et al. 2018). If those ages were further substantiated, that would imply a prehistoric California Paleoindian complex of equivalent age to the Clovis Tradition of the American Southwest and Plains. Significantly, the technological and typological elements for these early California projectile points appear slightly different and may represent a somewhat distinctive tradition - a bit different from their kindred artifacts in other areas of the United States.

In contradistinction to the above discussion, Beck and Jones (2010; see also Bryan 1988) argue, that Western Stemmed Points are in fact characteristic of the terminal Pleistocene and would be contemporaneous with the Clovis Complex. While it is widely assumed that fluted and unfluted concave-base points date to the terminal Pleistocene in the Mojave Desert, this has never been demonstrated radiometrically or chrono-stratigraphically. Nevertheless, recent finds at China Lake have noted that Fluted and Concave Base points have a different overall spatial distribution than Western Stemmed points. Finally, all three projectile point styles (Western Stemmed, Fluted and Concave Base) often occur in the same microenvironments, in closely similar depositional contexts, and at the very same sites (Basgall 1988, 2007; Basgall and Hall 1991; Giambastiani 2008, 2010; Giambastiani and Bullard 2010).

### *Early Holocene: Mojave or Lake Mojave Period*

Significant environmental changes, correlating with broad shifts in regional temperature, occurred in the post-Pleistocene with only minor changes in rainfall. Increased runoff from glacial melting resulted in the infilling of valleys and basins by streams, marshes, and lakes. Initially these large bodies of water supported great amounts of biota – including big game animals (e.g., deer, antelope, and bighorn). During this time there exists an ancient, well-established and wide-ranging prehistoric tradition in the Mojave Desert dating from ca. 12,000 to 8,000 cal BP. This archaeological complex is a well-known expression and received its geographic referent from the landmark studies of the Campbells and their research associates (Campbell et al. 1937).

The Campbells and their collaborators worked along the relict shorelines of Pleistocene Soda Lake and Silver Lake in the eastern Mojave Desert near Baker, California. These early Holocene assemblages were recognized for their distinctive formalized flaked stone tool kits. The Lake Mojave flaked stone tools include large stemmed points (identified as either the larger Lake Mojave type or the smaller Silver Lake form) that are considered as chronological diagnostics. Associated with these temporally sensitive point/tool forms are other stone tools including bifacial crescents, heavily worked domed (steep-sided) unifaces (end scrapers and side scrapers), knives, bifaces, gravers, plano-convex limaces, and larger core-cobble tools (cf. Beck and Jones 1997).

Throughout southern California and especially in eastern California Lake Mojave era sites have been recognized with a variety of other identifiers. In the Colorado Desert, Malcolm Rogers calls

similar traditions as his Playa Complex (Rogers 1939, 1966). In the San Diego area, the related assemblages have been designated as San Dieguito (Warren 1967; Warren and True 1961). William Wallace (1962) employs the Lake Mojave moniker for all such expressions throughout southern California.

Significantly, the majority of the Lake Mojave sites are exclusively surface expressions making them difficult to date, and only infrequently are they dated directly by employing radiocarbon assays. Nonetheless, Beck and Jones (1997, 2010; Willig et al. 1988) have assembled a series of radiocarbon dates for these stemmed points. Their research indicates that the Lake Mojave-related materials are older than 9500 cal BP and are possibly as ancient as 13,200 cal BP. If such dates were to apply in California they would be contemporaneous with the ages applied to the Clovis Tradition in the American Southwest and on the Plains. Yet, perhaps contrary to expectations, dates for the Lake Mojave materials at Fort Irwin cluster from 9,500 to 11,000 cal BP (Basgall 1993; Sutton et al. 2007).

Claude Warren and his colleagues (Warren 1967, 1984, 1986, 2008; Warren and Crabtree 1986; Warren and Schneider 2003; Warren et al. 1986) and other researchers (cf. Bedwell 1970) recognize that Western Stemmed point sites of the Lake Mojave Tradition were most often associated with extinct lakes. Since these materials were clustered around ancient shorelines the logical conclusion was that this early lifeway was lacustrine based and that artifacts would best be interpreted as representing a hunting emphasis on lakeshore resources. Further, since few artifacts were discovered that could be interpreting as milling equipment, only a very minor expression of plant food exploitation was indicated.

However, more recent research in the central and western Mojave Desert attests to a different perspective with a wider range of habitats for sites outside of lakeshore settings (Basgall 1993; Basgall and Hall 1994; Basgall et al. 1988; Sutton et al. 2007). Further, the faunal remains recovered from such sites attest to a dominant expression of small mammals (especially lagomorphs) and reptile exploitation rather than large game such as deer, pronghorn and bighorn sheep. Additionally, milling equipment, although evidently only a minor element in the Lake Mojave archaeological assemblages, are indeed a regular part of the documented cultural materials at such sites. The latter perhaps indicates that plant food was of some importance in the diet of these early Holocene peoples. Nevertheless, use-wear studies suggest that corms and bulbs, especially marshland taxa rather than small seeds, were the predominant plant foods processed (Basgall 1993, 2000).

Most researchers agree that high diversity of toolstone material and extensive curation and maintenance of Lake Mojave-age tools supports the conclusion that very large foraging areas and frequent residential moves were typical (Basgall 1989; Basgall and Hall 1994; Basgall and McGuire 1988; Delacorte 1999; Delacorte and McGuire 1993). It is posited that at this early time foraging groups were limited to a small number of family units and the groups themselves were

quite small. The food resources that were extracted would have been exhausted quickly causing people to move about the landscape often. Considering these frequent moves, the stone tool assemblages remained small and relatively homogenous (Kelly 1983, 1985, 1988; Shott 1986, 1989; Thomas 1983a, 1983b).

### *Middle Holocene: Little Lake or Pinto Period*

In the Middle Holocene during the time from ca. 8,000 to 4,000 cal BP temperature and aridity peaked. Lowland bodies of water shrank in size and associated plant communities dwindled - reaching a state that was incapable of supporting the former abundance of large game (Sutton et al. 2007). With the exception of certain rare refuge areas, human land use shifted to upland areas where a few relict streams and lakes remained. Correlating with these changes was the inception of a cultural expression known as the Pinto Complex.

Researchers have recognized that it has been challenging to clearly articulate the Middle Holocene cultural-historical traditions and settlement systems since few prehistoric sites date within this specific time frame. The latter circumstance may owe to a lack of geological visibility (Basgall 2009; Meyer and Rosenthal 2010) or alternatively this may be a reflection of the heightened aridity or a corollary demographic collapse (Elston 1982; Grayson 2011; Sutton et al. 2007; Warren 1986). From either perspective, there are a paucity of radiocarbon assays that fall within the Middle Holocene time and these expressions are especially absent during the waning years of this period - from ca. 5000 to 4000 cal BP (Sutton et al. 2007).

The Pinto Complex, rather than representing a different cultural group, was posited as an outgrowth of the former hunting tradition of the Lake Mojave Complex of the Early Holocene. Such a model was based on a variety of similarities in the two traditions. Spatial and temporal overlap in projectile point forms, the continued use of difficult-to-reduce toolstone (basalt and igneous fine-grained lithic materials) for bifacial tools - distinctly different from the use of cryptocrystalline and obsidian materials so common to later periods, continuity in the character of flaked stone production emphasizing percussion flaking in contrast with a later emphasis on pressure flaking, and the continued popularity of specialized tool forms (biface knives, ovate domed and keeled scrapers, and engravers) - all suggest a pattern of continuity.

Pinto Complex sites decline in number during the driest portion of the Middle Holocene era from 6500 to 4000 cal BP and are largely restricted to spring-side localities. Besides the differing land use patterns, the stone tool assemblage changes at this time from the formalized stone tool forms of the Early Holocene being replaced by flake scrapers, handstones, and milling slabs. Ground stone implements signal an important distinction and a growing emphasis on small seed use. Since hunting equipment persists, Claude Warren and others (Warren 1967, 1984, 1986) have suggested that large game procurement continued despite deteriorating climatic conditions and declining big game populations.

Archaeofaunal assemblages from Pinto sites attest to the fact that artiodactyls by this time are almost completely absent with small game, including tortoise, becoming the norm. Pinto populations, originally geared towards hunting, would have been hard-pressed to accommodate the changing environmental conditions and their adaptation may have ultimately failed. Populations may have either suffered extinction or perhaps migrated to more well-watered areas, abandoning their desert homes.

A few Middle Holocene sites in the southern Owens Valley and Rose Valley have produced assemblages similar to those in the Mojave Desert and appear to be consistent with generalized adaptations of highly mobile foragers with wide-ranging settlement patterns. However, substantial house floors discovered at Lubkin Creek (CA-INY-30) and the diverse array of occupational debris at the Stahl Site (CA-INY-182) at Little Lake (in the Coso Range) has led some to posit much greater residential stability and a degree of permanence in settlement pattern in some exceptional instances.

The hallmark and defining diagnostics for this period are large, heavy, bifurcate-stemmed dart points known as the Little Lake Series (Basgall and Hall 1992, 1994, 2000; Bettinger and Taylor 1974; Fitzgerald et al. 2005; Harrington 1957; Lanning 1963; Vaughan and Warren 1987). Researchers have recognized that these Pinto-like points were most frequent at the Stahl site near Little Lake (Harrington 1957).

The Pinto-like points that were discovered at Little Lake were originally thought to be morphologically distinct from Pinto points identified at the type site in the Pinto Basin in Riverside County in the southern Mojave Desert (Amsden 1937; Campbell and Amsden 1934; Campbell and Campbell 1935; Schroth 1994). In-depth research (Basgall and Hall 2000) relating to the questions of chronology and point classification suggests that the Little Lake points are largely indistinguishable from Mojave Desert examples typically identified as Pinto points.

The Basgall-Hall research redefined the Pinto Series indicating that there existed a larger, heavier, and more robust variant of this point style that has an age from 7500-4000 radiocarbon years before present (rcybp). A smaller, lighter, and more gracile form, more characteristic of the northern Great Basin, is equivalent with the Gatecliff Split-stem type previously identified by David Hurst Thomas (1981). Those latter artifacts are argued to date to a more recent vintage, consistent with a temporal range from ca. 5000-3200 rcybp. A further result of the Basgall-Hall Study was the discovery that there is considerable spatial overlap between both the robust and gracile variants with both forms having substantial representation in eastern California.

Other researchers disagree with the Basgall and Hall Pinto point chronology. Haynes (2004) argues that Pinto points range in age from 9,500 to 5,500 rcybp. Perhaps an age range of 11,000 to 3,500 cal BP is a more accurate representation for the full span of use of this rather enigmatic point form. Recent studies have led many researchers to conclude that Pinto points have a much

longer duration than has been typically applied. Pinto points, based on their most recent re-evaluations, are sometimes contemporaneous with Western Stemmed points (as above). However, Pinto points were infrequent during the earliest years of their introduction but flourished and endured for a much longer period time after Western Stemmed points ceased.

Heavily worn stone tools crafted from exotic toolstone suggests that prehistoric Middle Holocene Natives were still highly mobile. These patterns led Basgall and Hall (1992, 1994) to conclude that both early and middle Holocene adaptations in the Mojave Desert represent a more generalized subsistence orientation than conventionally portrayed by Warren (1967, 1984, 1986) and others.

***Late Holocene: Newberry Period or Gypsum Complex***

In the Late Holocene, beginning ca. 4000 / 3500 cal BP and continuing to about 2000 cal BP, significant interregional variability in aboriginal land use can be recognized. With respect to the local environmental conditions, Mehringer and Sheppard (1978) based on lake-core sampling at Little Lake, identify that available water increased about 3000 cal BP, with a subsequent dry period at about 2000 cal BP. Hence, cool winters and relatively wet intervals were characteristic of what is known as the Neo-Pluvial Period that occurred between 4000 and 2000 rcybp (Wigand and Rhode 2002).

In the Mojave Desert, Basgall and Hall (1992, 1994) identified cultural deposits from Fort Irwin that include a full complement of milling equipment, flaked stone tools, and the replacement of basalt and rhyolite by cryptocrystalline silicate toolstone. The occurrence of bifaces increases dramatically during this time. Nonetheless, prehistoric sites are often small and it has been argued that these settlements represent wide-ranging mobility oriented to short-term occupations rather than targeted procurement of specialized resources.

Many radiocarbon assays from houses and features are documented from the southern Owens Valley (Basgall and Delacorte 2012; Basgall and McGuire 1988; Byrd and Hale 2003). These well-built houses and associated remains provide robust data for chronological controls. These remains indicate an emphasis on cached and curated articles (including bifaces, bone tools, and milling equipment) and lend credence to the premise that these particular sites were seasonally re-occupied. Obsidian tool/debitage sources appear to indicate a wide-ranging and extremely expansive yet regularized annual settlement round. From food remains (faunal material and plant macrofossils) one may infer that forays were made to long-distance upland settings to procure specialized resources (pinyon nuts, bighorn sheep, and marmots) that were brought back to the base camp.

Warren et al. (1984) provide a contrasting view for this period and argue for the prominence of large game hunting due in part to their natural abundance based on ameliorating climatic conditions. Additional intensification in the use of plant foods is represented by increased

numbers of milling equipment. Warren and others identify a change in social organization from the smaller family-band units in earlier eras to multi-family groups. William Hildebrandt and Kelly McGuire (2002) similarly argue that settlements during the Late Holocene (Middle Archaic also known as the Newberry Period) may have been less mobile than originally implied and may be best interpreted as year-round occupations. They also argue that the characteristic settlement pattern appears to have incorporated sedentary occupations of ecological sweet spots where women remained at hamlets while men ranged to distant outlying areas for artiodactyl hunting.

One implication of this emphasis on artiodactyl exploitation was the necessity of serviceable hunting equipment. Stone tool reduction and particularly obsidian biface manufacture became critically important from about 2500 to 1500 cal BP. Amy Gilreath and William Hildebrandt (1997, 2011) argue that in the Coso Basin, obsidian stone tool reduction reached a peak level of task specialization where early stoneworkers produced stone bifaces in enormous numbers both for domestic use but mostly as surplus exports intended for trans-Sierran trade. During this same time span, an enormous number of rock drawings (petroglyphs) are recognized and appear to be associated with increase rites, revealing a level of socio-ceremonial complexity exceeding that of earlier and later periods (Garfinkel 2006; Garfinkel et al. 2009; Yohe and Garfinkel 2012).

Prehistoric settlements dating to the Late Holocene are marked by the occurrence of medium-sized to large stemmed and notched points. The most frequent forms are variants of the Elko, Humboldt (Concave Base and Basal-notched), and Gypsum Series. Heizer and Baumhoff (1961) were the first to define Elko points. This series is composed of large, heavy, notched points with variable stem characteristics (Heizer et al. 1968; O'Connell 1967). These include eared, corner- and side-notched specimens. Elko Contracting stem forms are often assigned to the Gypsum type having the same general chronological frame. In the western Great Basin, Elko points have often been found in contexts dating from 3750-1290 cal years B.P. (Basgall and McGuire 1988; Bettinger and Taylor 1974; Gilreath and Hildebrandt 1997; Heizer and Hester 1978; Justice 2002; Thomas 1981). Such a chronological position is supported by a plethora of radiocarbon, stratigraphic, and obsidian hydration data. However, it is becoming increasingly apparent that large, corner-notched and side-notched, variants of this Elko form sometimes occur in earlier contexts.

Gilreath and Hildebrandt (1997) observed that more robust Elko points, especially those thicker than 6.5 mm, regularly produce obsidian hydration dates that are more ancient than the Newberry Period. One explanation for this problem is the difficulty in identifying between earlier Pinto and the more recent look-alike Elko forms (Basgall and Hall 2000; Vaughan and Warren 1987). Finally, the Rose Spring site (CA-INY-372) on the western edge of the Coso Range is a culturally and naturally stratified deposit. Five separate successive units provided cultural material amenable to dating. The lower three strata range in age from ca. 4000 to 1700 cal BP and as such fall within this period (Clewlow et al. 1970; Yohe 1992).

### *Late Holocene: Haiwee, Rose Spring, Saratoga Springs Period*

The Mojave Desert witnessed a significant series of adaptation shifts beginning in this time period (ca. 2000 to 700 cal BP). During the onset of the period, a dramatic set of subsistence-settlement changes were documented. These changes include: the introduction of the bow and arrow replacing the dart and atlatl, a dramatic decrease in large game hunting, increased reliance on dryland hard seeds, the beginning of intensive green-cone piñon pine nut exploitation, and the development of sites emphasizing the acquisition of easily procured and abundant small game animals (especially with respect to large numbers of lagomorphs and grebes). These cultural changes may reflect a Numic (Great Basin Paiute-Shoshone) in-migration. Certain technological innovations and labor-intensive adaptive strategies are also broadly consistent with those of the intrusive Numic groups (Bettinger and Baumhoff 1982; Delacorte 1994, 1995).

In the western Mojave Desert, specialized sites first occur that are single component loci targeting small, easily-harvested, game animals harvested through communal hunts and mass capture that focus on jack rabbits and grebes (Gold 2005; Garfinkel 2006; McGuire et al. 1982). These sites and similar localities often contain abundant portable milling equipment, rock ring structures, bedrock milling, and plant food threshing features. These data reflect a shift to more intensive use of small game and local plants (dryland hard seeds) perhaps as a means of mitigating increasing human population pressure – consistent with the model presented by Bettinger and Baumhoff for Numic adaptations (1982).

Such an adaptation would have perhaps provided Numic peoples with a competitive advantage over existing pre-Numic populations since it would have enabled them to exploit a wider range of resources that were more costly to collect and process. Hence, resources with high extractive and processing costs would have been exploited only after the arrival of Numic groups in the area (cf. Bettinger and Baumhoff 1982; Delacorte and McGuire 1993).

From a careful study of the archaeological record, a pattern of lowland, intensive small-game hunting camps appears to have occurred with the development of large-scale, intensive, upland green-cone piñon pine nut exploitation. This pattern also is contemporaneous with an initial focus on the acquisition, mass processing, and storage of dryland seeds (Basgall and Delacorte 2003; Basgall and Giambastiani 1995). These seed camps routinely include rock rings, thought to be the foundations of brush structures. Many of these rock structures contain doorways facing toward the rising sun and are associated with numerous handstones, milling slabs, and bedrock grinding features.

Single-component Haiwee-age hunting camps are frequently located in "geographically isolated areas" (Delacorte 1994). Such localities provided access to a limited range of biotic communities and appear to have a rather specialized focus on a narrow array of subsistence resources. Hence, these settlements are a distinctly different group of sites from earlier or later occupations that tend

to overlap at the same settlements and hence evince a lack of continuity from earlier settlements.

Gilreath and Hildebrandt (1997) note that Coso obsidian lithic production shifts to major obsidian outcrops in Late Newberry (500 B.C. to A.D. 600) and this pattern continues into the Haiwee interval (A.D. 600 to 1300). Obsidian quarrying during this time is confined to a few massive exposures rather than the less plentiful but more widespread secondary deposits. In the Haiwee period, nearly exclusive use of the massive Sugarloaf Mountain Coso obsidian exposure occurs with other deposits largely ignored.

On the margins of Koehn Lake in Fremont Valley, south of the Indian Wells Valley and the Coso Range, Sutton (1987, 1991) reports on a village site (CA-KER-875) dating to this period. House structures with juniper center posts (*Juniperus* sp.) were documented. The site is well dated with radiocarbon assays and Coso obsidian hydration dates and appears to have been associated with a standing lake. The site was abandoned during the drying up of the area correlating with the initiation of a series of epic droughts known as the Medieval Climatic Anomaly (ca. AD 970 to 1350).

Rose Spring points are one of the key hallmarks of this time period. These points were originally recognized and described from the type-site of that same name, located in southern Owens Valley (also known as Rose Valley) on the western edge of the Coso Range (Lanning 1963: Yohe 1992, 1999, 2000). The Rose Spring arrow point is a small, narrow, triangular arrow point with a variety of stem forms. Rose Spring points are time markers and date primarily to the interval from ca. 2000-650 cal B.P. in the western Great Basin (Basgall and McGuire 1988; Bettinger and Taylor 1974; Garfinkel 2007; Gilreath and Hildebrandt 1997; Thomas 1981; Yohe 1992, 1999, 2000).

***Recent Holocene: Marana, Late Prehistoric***

This final cultural period (700 cal BP to the historic) represents the ethnographic occupation in the Mojave Desert by the Kawaiisu, Panamint Shoshone, Serrano, Chemehuevi, and Mohave. Desert Side-notched and Cottonwood arrow points are characteristic and brownware ceramics, imported soapstone beads, and pictographs also date to this time frame, as do many sites associated with systematic and intensive upland piñon exploitation (Bettinger 1978; Garfinkel and McGuire 1980; McGuire and Garfinkel 1976, 1980).

Resource intensification that began in the prior period continues and strengthens with settlements tied to seasonal differences in resource availability. The most spatially confined seasonal movement and the smallest foraging ranges occur during this time period. Region-wide expansion of diet breadth and intensification of small seed resources involved a change in the technology used in the collection and processing of these resources. It is argued that cutting and mass collecting of green, dryland, hard seeds provided a considerably higher return than was possible using the former method of seed beating. This pattern begins about 1300 cal BP but increases

substantially throughout the Late Prehistoric (650 cal BP – Contact) and into the Protohistoric era. Direct flotation evidence indicates mass harvesting and threshing of Indian rice grass (*Achnatherum hymenoides*), cattail (*Typha* spp.), goosefoot (*Chenopodium* spp.), and blazing star (*Mentzelia* spp.) seeds.

This time period also sees the final collapse of trans-Sierran trade in Coso obsidian. The early emphasis (ca. 8000-1000 cal B.P.) on biface preform or flake blank technology gives way to flake-based reduction. Large bifaces decrease in abundance, yet also diminish in size and formality ultimately being replaced by more numerous flake-based tools. Artiodactyl exploitation is dramatically reduced and replaced by procurement of small game including a tremendous increase in desert tortoise and reptile use. Evidence of increased contact with outside populations (e.g., the American Southwest) and the expansion of Numic-affiliated populations out of eastern California into most areas of the Great Basin, and much of the Mojave Desert are recognized during the last 1000 years (Bettinger and Baumhoff 1982; Fowler 1972; Lamb 1958).

**Table 2. Prehistoric Cultural Sequence for the Mojave Desert Region**

| Cultural Complex | Approximate Time Period in Calibrated Radiocarbon Years Before Present (cal B.P.) and Calendar Years Approximated as AD/BC | Artifact Characteristics |
|---|---|---|
| Fluted and Concave Base points, Late Pleistocene Period (Paleoindian) | 13,500 – 12,000 cal B.P.; 10,000 BC to 11,500 BC | Fluted points and Concave Base points (Western Clovis) |
| Lake Mojave Period | 12,000 – 8,000 cal B.P.; 10,000 BC to 6,000 BC | Western Stemmed points (Lake Mojave and Silver Lake) |
| Little Lake (Pinto) Period | 8,000 – 4,000 cal B.P.; 6,000 BC to 2000 BC | Pinto and Leaf-shaped points |
| Newberry (Gypsum) Period | 4,000 – 2000 cal B.P.; 2000 BC to AD 1 | Gypsum, Elko, and Humboldt Series points |
| Haiwee (Saratoga Spring) Period | 2000 – 700 cal B.P.; A.D. 1 – 1300 | Rose Spring, Eastgate, and Saratoga Springs points |
| Marana (Late Prehistoric) Period | 700 cal B.P. – Historic; AD 1300 – Historic with European explorers ca. AD 1770 | Desert Series (Cottonwood and Desert Side-notched) points and ceramics |

(Based on discussions in Bettinger and Taylor 1974, Garfinkel 2007; Warren 1980, 1984,)

## Ethnography

Recent research by Earle (1990, 1997, 2004a, 2004b, 2005a, 2005b), King (2003), and Johnson and Lorenz (2006) have helped to clarify the ethnic identification of Mojave Desert Native American groups. Their work with the John Peabody Harrington notes combined with analysis of the Franciscan sacramental registries testify that Mojave Desert dwellers in the Upland area were speakers of a dialect of Serrano. Surviving vocabularies and word lists support the identification of desert groups known as Vanyume (Garces' term was Beneme) as related to the Serrano. It has been further verified that Native groups occupying villages on the Mojave River near Victorville and in the region east of Barstow maintained marriage ties to downriver communities and were Vanyume in ethnic and linguistic affiliation.

Earle (1990, 1997) supports King's revisions of earlier territorial boundaries asserting that Serrano territory included the northern slopes of the San Gabriel Mountains, the Mojave River, and Antelope Valley. It also appears from their research that both the south and north slopes of the San Gabriel Mountains were "owned" and occupied by Serrano speakers.

Early 20th century ethnographic fieldwork among the Serrano was conducted by Kroeber (1925), Gifford (1918), Strong (1929), Benedict (1924), and Harrington (1986). More recent research by Bean (1972), Bean and Smith (1978), and Bean, Vane, Lerch, and Young (1981) has helped to focus attention on key research questions in an attempt to clarify the relationship of Serrano land use patterns, territorial attributions, subsistence-settlement patterns, and social, ceremonial, and political organization.

The economic resource base of the Serrano was determined in part by the seasonal availability of key animals and plants exploited for basic subsistence (Earle 1992). Hunting activities supplemented a diet mainly emphasizing plants. Hunting excursions were both an individual affair but also incorporated communal drives, and trap lines to snare small animals (e.g., squirrels, rodents, tortoise, and chuckwalla). Some desert hunting areas to the east in the Mojave Desert and in the vicinity of the Mojave River may have been shared with adjacent groups (e.g., Chemehuevi and/or Mojave).

Mule deer were available in the San Gabriel and San Bernardino Mountains. Deer would migrate to lower elevations during the winter and would be available in the lower foothills. Pronghorn frequented the valley floor year-round but were not consistently abundant and were hunted only occasionally using communal surrounds and group drives. The latter technique was also used to ensnare large numbers of jackrabbits during the fall when they were especially abundant. Mountain sheep were available in the higher mountains but would have been rarely procured. Waterfowl could be captured using bows and arrows and special nets. Ducks, quail, geese, and grebes would have been available in considerable numbers during their breeding seasons and in association with riparian settings.

Abundant stands of acorns, juniper, mesquite, and pinyon were available to extended gathering expeditions. These might involve several lineages collaborating under one leader's authority and would have entailed accessing the resource base of surrounding groups (Bean and Smith 1978; Benedict 1924:391-392; Drucker 1937). Cattail / bulrush seeds (*Typha* spp. and *Scirpus* spp.), various roots, shoots, bulbs, and other hard seeds were all principal plant foods. The most likely plant resources that were of significant economic importance that have been identified paelobotantically or noted in the immediate vicinity of the Project were Indian rice grass (*Achnatherum hymenoides*), chia (*Salvia columbariae*), blazing star (*Mentzelia* spp.), and goosefoot (*Chenopodium* spp.)

Edward W. Gifford conducted a detailed study of the marriage practices and sociopolitical organization of native southern California Native Americans during the time from 1916 through 1917 (Gifford 1918). Based on these studies, he developed a model of Serrano social organization (Earle 2004a, 2004b). William Duncan Strong (1929: 5-35) conducted even more extensive studies among the Serrano, Cahuilla, Luiseño, and Cupeño in 1925. His record is most significant as a very early observer of the Serrano kinship system. He indicated that the Serrano were an unusual California group possessing true patrilineal clans. A clan is a kin group based on descent from a common ancestor, as traced through the male or the female line. Clans are normally exogamous, marriage within the clan being regarded as incest.

Patrilineal clans are patterned such that all males, their descendants, and their wives were part of a single group. Clans may be segmented into subclans or lineages. A woman retained her own lineage name but upon marriage was incorporated into the clan of her husband. The transfer of women from one ceremonial affiliation to another, upon marriage, was characteristic of all southern California Takic (the linguistic subfamily of the Serrano) groups.

King's research provides compelling evidence that the Serrano exhibited a totemic moiety structure (contra Blackburn and Bean 1978). A moiety is either of two kinship groups based on unilateral descent that together make up a tribe or society. Totemic moieties are two-fold divisions of society with subgroups that identify themselves as descended from a prominent religious figure (mostly animal-humans) that are part of their oral traditions. In the Serrano case, their society was divided into two parts identified with either Coyote or Wildcat. The Coyote moiety had the most important political leaders. Moiety out-marriage excluded partners from half the neighboring Serrano settlements. Hence, only settlements of opposing moieties were interrelated through marriage.

Serrano villages were generally more dispersed in the Mojave Desert. This dispersed pattern resulted in marriages linking together very large areas. Many of the settlements had marriage ties with villages over 50 miles away and counter intuitive was the fact that the closest relationships were not necessarily with the nearest villages – but rather with settlements affiliated with opposing moieties further distant.

King's study of the mission registries indicates that there were many important hereditary positions among the Serrano. Each village contained a chief, ceremonial manager, two messengers, as well as various shamans, diviners, and other ritual specialists. Each of these leaders oversaw different elements of Serrano life involving festivals, dances, and warfare.

Ethnographic data attests that a major native trade and travel corridor facilitated a long-distance exchange system. Recent research has supported the importance of long distance trade linking coastal southern Californian Chumash tribes with inland groups including the Yokuts, Kawaiisu, Serrano, Chemehuevi, and the Mohave in California and the Walapai, Havasupai, and Hopi in Arizona (Earle 2005a). Shell bead trade was one of the mediums of exchange and was used as a kind of currency or money. This system was significant since it involved trade, travel, and exchange covering hundreds of miles and was a system of exchange of native goods that linked various ethnic groups politically and economically.

This trade and travel route ran from the American Southwest (principally the Hopi territory in Arizona), along the Colorado River to the Mojave River thence through the central Mojave Desert into the Antelope Valley and east to the Pacific Coast (Davis 1961; Farmer 1935; Sample 1950). These circuits of exchange cut across political and cultural boundaries. A number of researchers have argued that such an exchange system may have been an influential factor in facilitating semi-sedentary settlement and complex sociopolitical organization for the Serrano (Earle 2005a; Robinson 1977; Sutton 1980).

Davis (1961) after reviewing the available data on native California trade and exchange determined that in southern California the only Native group to travel great distances in trading expeditions were the Mohave. It appears that the Serrano developed long-standing political and social relationships with the Mohave. In fact, the Serrano were their exchange or trading partners and acted as hosts facilitating their travel through sometimes unfamiliar and potentially hostile territories.

**History**

The Historic era of California is divided into the Mission or Spanish Period (1769 to 1831), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present).

***Spanish Period (1769-1831)***

The first known European explorers to pass through the Mojave Desert and travel into the San Bernardino Mountains were Lieutenant Pedro Fages and a party of soldiers in 1769. This group of explorers were led by a Spanish priest, Francisco Garces, who guided Juan Bautista de Anza through the high desert region. In 1771, De Anza led a group from Arizona to create a headquarters at the Mission San Gabriel near what is now the City of Pasadena. Mission San Gabriel Archangel was formally established in 1771, proved to be the most economically successful of all the

California missions. Its outlying ranch lands, grain fields, orchards and vineyards constituted a vast pastoral empire, eventually extending many miles inland into the San Bernardino Valley. From the time of the Anza expedition until the Mexican Rancho Period (see below), the land surrounding Ontario was employed as grazing land by the Mission. Cattle ranching during this time became a thriving industry. Cattle bred rapidly in this more amenable Mediterranean climate. Soon hundreds of thousands of head of cattle were ranging across the verdant pasture lands.

In 1772, Pedro Fages, a military commander, tracked deserters throughout San Bernardino County. In 1774, Juan Bautista de Anza led an expedition from Mexico and set up camp along San Antonio Creek. The Anza camp site was near present day Ontario. Anza named that place Arroyo de los Osos, or "Bear Gulch."

***Mexican or Rancho Period (1831-1848)***

The notable Old Spanish Trail was established between southern California and Santa Fe, New Mexico in the 1830s (Beck and Haase 1974). Traders from New Mexico traveled for two months to cross the rugged terrain bringing woolen goods on mules and pack horses and trading them for horses, mules, silks and Chinese goods from California. The San Bernardino Valley provided as an excellent pasturage for the animals involved in these trading affairs.

Spanish rule was overthrown by Mexico in 1791, and eventually the missions lost their land holdings as the Mexican government passed the Secularization Act in 1833 (Beattie and Beattie 1974). Following the secularization of the missions, large land grants were provided to the most prestigious and well-connected citizens. This change in land tenure ultimately led to European settlement of the ranchos for raising cattle in the San Bernardino Valley.

The Rancho Period lasted from 1834 until the Mexican War of 1846. Colonists were encouraged to settle in the San Bernardino Valley to help protect the region from raids by local Indians. Recipients of the land grants included Spanish gentlemen (dons) from many of what came to be known as the first families of California, such as the Lugos, Sepulvedas, Yorbas, Bandinis, Tapias, Palomares, and Picos.

***American Period (1848- Present)***

After the Mexican-American War in 1848 and the discovery of gold in California, the Old Spanish Road was widely-used trade route for the shipment of goods and Mexican mules and horses. This allowed travelers from Salt Lake City to Las Vegas to travel through the Cajon Pass to reach San Bernardino and Los Angeles.

In 1853 the County of San Bernardino was created and divided into three townships: San Bernardino, San Salvador and Chino. San Bernardino was designated as the county seat, with the Mormon Council House serving as the first courthouse.

Beginning in 1873, San Bernardino County saw many new railroad lines and train depots being constructed. By 1886, the San Bernardino Valley had two transcontinental railroad systems. In the 1870s and 1880s, cowboys continued to lead herds of cattle over trails through the valley to the railroads. In the 1870s and afterward, small towns in the high desert region and near the Calico Mountains were established as railway stops on the Santa Fe Railroad (Kyle 1990). A silver strike in the Calico Mountains brought upon a modest mining boom in 1881 (Schuiling 1984:95).

Another impetus to growth was the growing importance of citrus agriculture. The area exhibited especially favorable circumstances for citrus growing. These factors included the decomposed granite soil, good drainage, ready water, abundant sunshine, and cool winter nights. The completion of the railroads and the growing citrus industry facilitated a land boom. During the interval of the last two decades of the nineteenth century (188—1900), 30 new communities were initiated in the region.

## PERSONNEL

Dr. Alan Garfinkel Gold, RPA requested the staff at South Central Coastal Information Center (SCCIC), California State University, Fullerton to conduct a cultural resources records search. Following receipt of the data from SCCIC, a systematic pedestrian field survey was conducted. Following completion of the field survey, this report was prepared based on the results of the data search and the field investigations.

## METHODS

### Research

A cultural resources records search was conducted by the SCCIC on June 26, 2018. The results of the records search are summarized in this report. The records search details the previously documented cultural resources in the Project area and employs a half-mile buffer surrounding it. A Sacred Lands File Search was also conducted through the Native American Heritage Commission (NAHC). This search offers valuable contextual information regarding Native American traditional land use in the high desert region. Eleven interested parties of Native American heritage were identified as being associated with the area and were contacted for consultation. A copy of the transmittal letter and documentation of the RCA Associates outreach are provided in Appendix B.

### Field Survey

A comprehensive archaeological field survey was conducted by Dr. Gold and Alina Landa on July 12, 2018. The survey was conducted by walking roughly parallel transects in an east-west direction. The transects were spaced approximately 10 meters apart to provide thorough coverage of the Project site. 4 shovel-test pits were excavated to a depth of approximately 30 cm. The project site is located north of 15th Street and south of what is currently Upland Hills Country Club.

## RESULTS

### Native American Consultation

The NAHC conducted a Sacred Lands File Search and returned negative results for Sacred Lands in and near the proposed Project area. All potentially interested tribes identified by the NAHC were contacted for information regarding their knowledge of cultural resources that were within or near the Project area. These groups are: Gabrieleno Band of Mission Indians - Kizh Nation, Gabrieleno /Tongva San Gabriel Band of Mission Indians, Gabrieleno /Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Morongo Band of Mission Indians (Chairperson and Cultural Resources Manager), Pauma Band of Luiseno Indians - Pauma and Yuima Reservation, San Fernando Band of Mission Indians, San Manuel Band of Mission Indians, and Serrano Nation of Mission Indians.

Ms. Jessica Mauck, Cultural Resources Analyst of San Manuel Band of Mission Indians (SMBMI) replied via email to advise RCA that the Project area is within Serrano ancestral territory and is of interest to the Tribe. However, SMBMI indicated that the Project is unlikely to have any major concerns with the area. The Gabrieleno Band of Mission Indians- Kizh Nation, the Administrative Specialist replied via email to express their interest to consult with the City of Upland.

### Cultural Resources Records Search

The South Central Coastal Information Center (SCCIC) at California State University, Fullerton conducted a record search of previously documented cultural resources sites and cultural resources surveys conducted on the property and within a half-mile radius (buffer) of the subject property. The search included a review of all historic and prehistoric archaeological resources and any built-environment resources as well. Additionally, this review includes an archival search of the existing cultural resources reports on file with the Information Center. The California Points of Historical Interest (CPHI), California Historical Landmarks (CHL), California Register of Historical Resources (CALREG), National Register of Historic Places (NRHP), and California State Historic Properties Directory (CHPD) were all reviewed for the project site. According to the Information Center results, two cultural resource studies have been previously conducted within the project area, however, no cultural resources were documented during these studies. Seven cultural resources reports have been completed and those studies identified three cultural

resources within the half-mile search radius (buffer) surrounding the project area. Table 3 shows the known cultural resources sites documented within a half-mile radius surrounding the project area.

**Table 3. Known Cultural Resources Within the Half-mile Buffer of the Project Area**

| Primary Number | Trinomial/ Resource Name | Age | Type | Evaluation |
|---|---|---|---|---|
| **P-36-000899** | CA-SBR-000899/ Red Hill Site | Prehistoric | Milling Artifact Concentration | 1975 (Crowley) |
| **P-36-006255** | CA-SBR-006255H | Historic | Wells/cisterns, Water conveyance system, Dam, Walls/fences, Standing Structures | 1989 (Hammond/ Sutton, Caltrans); 2009 (Michael Dice, BA); 2014 (A. Myers, ECORP) |
| **P-36-015497** | Base Line Road | Historic | Highway/trail | 1973; 2014 (Josh Smallwood, Helix) |

**Site P-36-000899**

Site P-36-000899 consists of one metate, one metate fragment, and six manos.

**Site P-36-006255**

Site P-36-006255 consists of a historic-period water system constructed in the early 1930s. Hammond and Sutton recorded sixteen water features which includes two bridge-like water diversion structures, a water diversion, two concrete stand pipes, a horizontal riveted steel pipe, wire-bound rock, eight water spreading/distribution gates, and a horizontal concrete pipe (Hammond 1989). Michael Dice of Michael Brandman Associates updated this site record in 2009 as part of the San Antonio Trails project and included additional features. He identified an additional seven east-west trending, stream flow stabilizers of wire-wrapped rock. The site was determined not eligible for the NRHP in 2004 but was not evaluated for local listing (Dice 2009).

ECORP archaeologist revisited part of the recorded site and noted an additional five features associated with the expanded site boundaries. These include three water diversion structures, each one containing a wall with outward facing granite cobbles for support (Features 17-19). Feature 20 is a steel retaining wall made of heavy steel mesh grate. The steel mesh is held in place by vertical and horizontal sections of roughly-cut railroad track. The horizontal section of railroad track is marked CARNEGIE 1095 ET. One vertical rail section is marked EV STEEL XD. Feature 21 is an east-west trending low retaining wall composed of granite cobbles that are bound in a wire net (Dice 2009).

### Site P-36-015497

Site P-36-015497 is Baseline Road, constructed on the Southern California Baseline, which was surveyed by Col. Henry Washington in 1853. It is registered as California Point of Historical Interest No. 12 (Kaiser 1973). Baseline Road began as a dirt wagon road for freight traffic, and is today a modern, six-lane asphalt-concrete roadway with a landscaped center median. While Baseline Road is historically associated with the Southern California Baseline of 1853, the survey line itself is an imaginary map line, with no physical manifestation of it or the survey markers located within or adjacent to the Project alignment (George and Smallwood 2014).

Table 4 (below) provides a list of the two cultural resources survey reports identified with the Project site and also includes seven additional cultural resources survey reports completed within the half-mile buffer of the proposed Project.

**Table 4. Cultural Resources Survey Reports in the Project and within the ½ mile Buffer**

| Info Center No. | Authors | Title | Year |
|---|---|---|---|
| **SB-00702** | Archaeological Associates | Archaeological Survey Report: UltraSystems Project #4426 | 1978 |
| **SB-00806** | Wilmoth, Stan | Environmental Impact Evaluation: An Archaeological Assessment of Both Sides of Sixteenth Street (Baseline) in the City of Upland, San Bernardino County, California | 1979 |
| **SB-01660** | Gross, Lorraine S., Kevin J. Peter, and William B. Gilmour | Cultural and Paleontological Resource Investigations of the Lakes at San Antonio Project, City of Upland, San Bernardino County, California | 1987 |
| **SB-03558** | Duke, Curt | Cultural Resource Assessment for PBMS Wireless Facility CM 264-02, County of San Bernardino, CA SPP | 2000 |
| **SB-05358** | Sider, W.A. | Cucamonga Creek 1776-1976 After 200 Years | 1976 |
| **SB-06083** | Wlodarski, Robert J. | Bechtel Wireless Telecommunications Site ES0258 (Upland Water Tanks) located at 580 East 15th Street, Upland California 91785 | 2008 |
| **SB-06666** | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System | 2009 |

| | | | |
|---|---|---|---|
| | | Project, Cities of Rancho Cucamonga, Upland, and Ontario, San Bernardino County, California | |
| **SB-06667** | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga… | 2009 |
| **SB-08257** | Tang, Bai | Due-Diligence Historical/Archaeological Resources Study Inland Empire Utilities Agency Recharge Basin Maintenance Plan Chino Basin Area, San Bernardino and Riverside Counties, California CRM TECH Contract No. 2989 | 2016 |

### Field Survey

During the field survey, the Project area was carefully examined for the presence of any cultural resources, including prehistoric or historic archaeological sites or historic buildings. No cultural resources were discovered. The survey was conducted by walking parallel transects in an east-west direction. These transects were spaced approximately 10 meters apart. Five shovel-test pits were excavated. The site contains a percolation basin or trench, for water runoff. Constant soil hydration allowed vegetation to grow throughout the border of the site.

### Shovel-test Pits

Five shovel-test pits were excavated to further test for the presence of buried cultural resources deposits within the Project area. The test pits were excavated to a depth of approximately 30 centimeters (cm). No cultural resources (flaked stone, bone, charcoal, historic or prehistoric artifacts [e.g., projectile points, stone tools, shell or stone beads, ceramics, or historic artifacts [e.g., nails, china, etc.]) were discovered. Figure 3 shows the locations of each test pit. Test pit locations were distributed in an east-west orientation and spread across the Project area.

## CONCLUSION AND CULTURAL RESOURCES RECOMMENDATIONS

This cultural study was completed pursuant to CEQA. Field survey investigations were conducted on July 12, 2018 and did not identify any cultural resources, including prehistoric or historic archaeological sites or historic buildings within the project area. Five shovel-test pits were completed on the site and provided no indication of buried cultural resources.

The NAHC was contacted to complete a Sacred Lands File Search of the property, which returned negative results. The NAHC also provided a list of potentially interested parties and affiliated Native American individuals and groups. These individuals were contacted for further outreach and to identify if there were any concerns related to cultural values and resources for the proposed project area. SMBMI advised via email that although the project area lies within Serrano ancestral territory, the location of the project area may not concern the Tribe. A representative from the Gabrieleno Band of Mission Indians - Kizh Nation replied via email to express their interest to consult with the City of Upland regarding the proposed project. Their contact information, as well as a list of Native American Tribal contacts is referenced in Appendix B.

On June 26, 2018, SCCIC conducted a records search for the project area, including a search of the half-mile radius surrounding the property. Although two cultural resources survey reports have been completed within the project area, no cultural resources had been previously discovered. Within the half-mile search radius, site records indicate that seven cultural resources survey reports have been completed, and three cultural resources sites have been documented within this area. Site P-36-000899 consists of a prehistoric scatter of milling artifacts. Site P-36-006255 consists of historic-age wells/cisterns, a water conveyance system a dam, and a wall/fence feature. Site P-36-015497 consists of the historic Baseline Road highway/trail. Thorough investigation within the Project area did not result in discovery or identification of any cultural resources sites or artifacts.

The subject property remains a sensitive area based on previous archaeological and historical findings from the general area, as well as its proximity to the Cajon wash and surrounding traditional Native American land use areas.

If previously undocumented cultural resources are identified during earthmoving activities, a qualified archaeologist should be contacted to assess the nature and significance of the find, diverting construction activities from the location of the discovery. If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her representative, the MLD may inspect the site of discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD shall make recommendations as the manner in which to treat the human remains and any associated offerings.

## REFERENCES


Archaeological Associates

1978 Archaeological Survey Report: UltraSystems Project #4426. On file, South Central Coastal Information Center, California State University, Fullerton.

Basgall, Mark E.

1988 Archaeology of the Komodo Site, an Early Holocene Occupation in Central Eastern California. In *Early Human Occupation in Far Western North America: The Clovis-Archaic Interface*, edited by Judith A. Willig, C. Melvin Aikens, and John L. Fagan, pp. 103–119. Nevada State Museum Anthropological Papers, Vol. 21. Nevada Department of Cultural Affairs, Division of Museums and History, Carson City, Nevada.

1993 *Early Holocene Prehistory of the North-central Mojave Desert*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

2007a Another Look at the Ancient Californians: Resurvey of the Emma Lou Davis Stake Areas and Reassessment of Collections, Naval Air Weapons Station, China Lake, Kern County, California. On file, Naval Air Weapons Station, China Lake, California.

2007b Prehistoric People in an Evolving Landscape: A Sample Survey of the China Lake Basin and its Implications for Paleoindian Land Use. On file, Naval Air Weapons Station, China Lake, California.

2012 Middle Archaic Cultural Adaptations in the Eastern Sierra Nevada: Data Recovery Excavations at CA-INY-1384/H, INY-6249/H, INY-6250, and INY-6251/H. Submitted by Archaeological Research Center, Department of Anthropology, California State University, Sacramento. On file, California Department of Transportation, District 9, Bishop.

Basgall, Mark E. and Mark A. Giambastiani

1995 Prehistoric Use of a Marginal Environment: Continuity and Change in Occupation of the Volcanic Tablelands, Mono and Inyo Counties, California. *Center for Archaeological Research at Davis Publication* 12.

Basgall, Mark E. and Matthew C. Hall

1991 Relationship between Fluted and Stemmed Points in the Mojave Desert. *Current Research in the Pleistocene* 8:61–63.

1992 Fort Irwin Archaeology: Emerging Perspectives on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26(5):1–7.

1994 Status Report on Cultural Resources Management at the National Training Center, Fort Irwin, 1993–1994: An Addendum to the Fort Irwin Historic Preservation Plan. Submitted by Far Western Anthropological Research Group, Inc., Davis, California.

On file, United States Department of Defense, National Training Center, Fort Irwin, California.

2000 Morphological and Temporal Variation in Bifurcate-Stemmed Dart Points of the Western Great Basin. *Journal of California and Great Basin Anthropology* 22(2):237–276.

Basgall, Mark E. and Kelly R. McGuire
1988 The Archaeology of CA-INY-30: Prehistoric Culture Change in the Southern Owens Valley, California. On file, California Department of Transportation, Office of Environmental Analysis, Sacramento.

Bean, Lowell John
1972 *Mukat's People: The Cahuilla Indians of Southern California*. Berkeley: University of California Press.

Bean, Lowell John and Charles Smith
1978 Serrano. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 570-574. Washington: Smithsonian Institution.

Bean, Lowell John, Sylvia Brakke Vane, Michael Lerch, and Jackson Young
1981 *Native American Places in the San Bernardino National Forest*. On file at the Department of Agriculture, United States Forest Service, South Zone Office, Arcadia, California.

Beck, Warren A., and Ynez D. Haase
1974 *Historical Atlas of California*. Oklahoma City: University of Oklahoma Press.

Beck, Charlotte and George T. Jones
1997 The Terminal Pleistocene/Early Holocene Archaeology of the Great Basin. *Journal of World Prehistory* 11(2):161–236.

2010 Clovis and Western Stemmed: Population Migration and the Meeting of Two Technologies in the Intermountain West. *American Antiquity* 75(1):81–116.

Bedwell, Stephen F.
1970 *Prehistory and Environment of the Pluvial Fork Rock Lake Area of South-Central Oregon*. Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene.

Benedict, Ruth
1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3):366-392.

Bettinger, Robert L.
1978 Alternative Adaptive Strategies in the Prehistoric Great Basin. *Journal of Anthropological Research* 34(1):27–46.

Bettinger, Robert L. and Martin A. Baumhoff
1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47(3):485–503.

Bettinger, Robert L. and R. Ervin Taylor
1974 Suggested Revisions in Archaeological Sequences of the Great Basin and Interior Southern California. *Nevada Archaeological Survey Research Papers* 5:1–26. Reno, Nevada.

Blackburn, Thomas C. and Lowell John Bean
1978a Kitanemuk. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 564-569. Washington: Smithsonian Institution.

1978b Serrano. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 570-574. Washington: Smithsonian Institution.

Borden, Ferris W.
1971 The Use of Surface Erosion Observations to Determine Chronological Sequence in Artifacts from a Mohave Desert Site. *Archaeological Survey Association of Southern California Papers* 7.

Bryan, Alan L.
1988 The Relationship of the Stemmed Point and Fluted Point Traditions in the Great Basin. *Nevada State Museum Anthropological Papers* 22:53–74.

Byrd, Brian F., and Micah Hale
2003 Lacustrine Lifestyles along Owens Lake: National Register Historic Places (NRHP) Evaluation of 15 Prehistoric Sites for the Olancha/Cartago Four-Lane Project, United States Route 395, Inyo County, California. On file, California Department of Transportation, District 6, Fresno.

Campbell, Elizabeth W. Crozer
1931 An Archaeological Survey of the Twenty-Nine Palms Region. *Southwest Museum Papers* 7:1-93.

Campbell, Elizabeth W. Crozer and William H. Campbell
1935 The Pinto Basin Site: An Ancient Aboriginal Camping Ground in the California Desert. *Southwest Museum Papers* 9:1-51.

Campbell, Elizabeth W. Crozer, Ernst Antevs, Charles E. Amsden, Joseph A. Barbieri, and Francis D. Bode
1937 The Archaeology of Pleistocene Lake Mohave: A Symposium. *Southwest Museum Papers* 11.

Clewlow, C. William, Jr., Robert F. Heizer, and Rainer Berger
1970 An Assessment of the Radiocarbon Dates for the Rose Spring Site (CA-Iny-372), Inyo County, California. In Papers on Anthropology in the Great Basin, pp. 19-27. *University of California Archaeological Research Facility Contributions* 7.

Crowley, S.
1975 Site Record for P-36-000899. On file, South Central Coastal Information Center, California State University, Fullerton.

Davis, Emma Lou
1978 The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country. *Natural History Museum of Los Angeles County,* Science Series 29. Los Angeles.

Davis, James T.
1996 Trade Routes and Economic Exchange among the Indians of California. Berkeley: *University of California Archaeological Survey Reports* No. 54.

Drucker, Philip
1937 Culture Element Distributions V: Southern California. *University of California Anthropological Records* 1(1):1-52. Berkeley.

Earle, David D.
1990 New Evidence on the Political Geography of the Antelope Valley and Western Mojave Desert at Spanish Contact. In Archaeology and Ethnohistory of Antelope Valley and Vicinity, edited by Bruce Love and William H. DeWitt, pp. 87-104. *Antelope Valley Archaeological Society Occasional Papers* Number 2.

2005a The Mojave River and the Central Mojave Desert: Native Settlement, Travel, and Exchange in the Eighteenth and Nineteenth Centuries. *Journal of California and Great Basin Anthropology* 25(1):1-38.

2005b Chemehuevi Population Movements and the Numic Frontier in the Western and Central Mojave Desert after European Contact. In Papers in Antelope Valley Archaeology and Anthropology edited by Roger W. Robinson, pp. 135-146. *Antelope Valley Archaeological Society Occasional Papers* Number 4.

Delacorte, Michael G.
1994 Late Prehistoric Resource Intensification in the Numic Heartland. Paper presented at the 24th Annual Great Basin Anthropological Conference, Elko, Nevada.

1995 Desert Side-notched Points as a Numic Population Marker in the West-Central Great Basin. Paper presented at the 29th Annual Meeting of the Society for California Archaeology, Eureka, California.

Dice, Michael H
2009 Site Record for P-36-0006255. On file, South Central Coastal Information Center, California State University, Fullerton.

Driver, Harold E
1937 Culture Element Distributions, VI: Southern Sierra Nevada. *University of California Anthropological Records* 1(2):53–154. Berkeley.

Duke, Curt
2000 Cultural Resource Assessment for PBMS Wireless Facility CM 264-02, County of San Bernardino, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Eerkens, Jelmer W.
2004 Privatization, Small-Seed Intensification, and the Origins of Pottery in the Western Great Basin. *American Antiquity* 69:653-670.

Elston, Robert G.
1982 Good Times, Hard Times: Prehistoric Culture Change in the Western Great Basin. In Man and Environment in the Great Basin, edited by David B. Madsen and James F. O'Connell, pp. 186–206. *Society for American Archaeology Papers* No. 2, Washington, D.C.

Encarnacion, Deirdre
2009 Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga, Upland and Ontario, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Farmer, Malcolm F.
1935 The Mojave Trade Route. *Masterkey* 9(5):154-157.

Fenenga, Gerrit
2013 Clovis Blade Technology at the Witt Site, Tulare Lake, California. Paper presented to the Sacramento Archaeology Society, West Sacramento California.

Fitzgerald, Richard T., Terry L. Jones, and Adella Schroth
2005 Ancient Long-distance Trade in Western North America: New AMS Radiocarbon Dates from Southern California. *Journal of Archaeological Science* 32(3):423–434.

Fowler, Catherine
1972 Some Ecological Clues to Proto-Numic Homelands. In Great Basin Cultural Ecology: A Symposium, Don D. Fowler, editor, pp. 105-122. *Desert Research Institute Publication in the Social Sciences* 8, Reno.

Garfinkel, Alan P.
2006 Paradigm Shifts, Rock Art Theory, and the Coso Sheep Cult of Eastern California. *North American Archaeologist* 27(3):203-244.

2007 Archaeology and Rock Art of the Eastern Sierra and Great Basin Frontier. *Maturango Museum Publication* 22. Maturango Museum, Ridgecrest, California.

Garfinkel, Alan P. and Donald R. Austin
2011 Reproductive Symbolism in Great Basin Rock Art: Bighorn Sheep Hunting, Fertility, and Forager Ideology. *Cambridge Archaeological Journal* 21(3):453-471.

Garfinkel, Alan P., Donald R. Austin, David Earle, and Harold Williams
2009 Myth, Ritual and Rock Art: Coso Decorated Animal-Humans and the Animal Master. *Rock Art Research* 26(2):179-197.

Garfinkel, Alan P., Jerry N. Hopkins, and Craig E. Skinner
2008 Ancient Stones of Black Glass: Tracing and Dating Paleoindian Obsidian Artifacts from China and Tulare Lakes. In *Contributions to Tulare Lake Archaeology IV: Ice-age Stone Tools from the San Joaquin Valley,* edited by Jerry N. Hopkins and Alan P. Garfinkel, pp. 59-97. Coyote Press Publications, Salinas, California.

Garfinkel, Alan P., Geron Marcom, and Robert A. Schiffman
2007 Culture Crisis and Rock Art Intensification: Numic Ghost Dance Paintings and Coso Representational Petroglyphs. *American Indian Rock Art* 33:83-103.

Garfinkel, Alan P., Robert A. Schiffman and Kelly R. McGuire
1980 Archaeological Investigations in the Southern Sierra Nevada: The Lamont Meadow and Morris Peak Segments of the Pacific Crest Trail. *Cultural Resources Publications, Archaeology*. Department of the Interior, Bureau of Land Management, Bakersfield District, Bakersfield, California.

Garfinkel, Alan P. and Harold Williams
2011 *Handbook of the Kawaiisu: A Sourcebook and Guide to Primary Resources on the Native Peoples of the far southern Sierra Nevada, Tehachapi Mountains, and southwestern Great Basin*. Wa-hi Sina'avi Publications, Bakersfield, California.

2015 *The Handbook of the Kawaiisu: A Sourcebook and Guide to Primary Resources on the Native Peoples of the far southern Sierra Nevada, Tehachapi Mountains, and southwestern Great Basin*. Revised Second Edition. Wa-hi San'avi Publications and the Tehachapi Heritage League, Tehachapi, California.

Garfinkel, Alan P., David A. Young, and Robert M. Yohe
2010 Rock Art, Resource Depression, and Ritual Bighorn Hunting in the Coso Range of Eastern California: A Simulation Model. *Journal of Archaeological Science* 37:42-51.

George, Joan, and Josh Smallwood
2014 Phase I Cultural Resources Assessment for the Etiwanda Pipeline North Liner Repair Project, Cities of Fontana and Rancho Cucamonga, San Bernardino County, California. Prepared for Helix Environmental Planning, La Mesa, CA. On file, South Central Coastal Information Center, California State University, Fullerton.

Giambastiani, Mark A.
2008 An Archaeological Survey of 10,121 Acres in the Spangler Hills Open Area and on Adjacent Lands within Searles Valley, Inyo County, California. On file, Bureau of Land Management, Ridgecrest, California.

2011 An Archaeological Inventory of Approximately 2,700 Acres in the Lost Cabin, Water Canyon, and Pyramid Point Areas, North and South Ranges, Naval Air Weapons Station, China Lake, Inyo and San Bernardino Counties, California. Submitted by

ASM Affiliates, Inc., Reno, Nevada. On file, Environmental Planning and Management Department, Naval Air Weapons Station, China Lake, California.

Giambastiani, Mark A. and Thomas Bullard
2010 Terminal Pleistocene-Early Holocene Occupations on the Eastern Shoreline of China Lake, California. *Pacific Coast Archaeological Society Quarterly* 43 (1-2):50-70.

Gifford, Edward
1918 Clans and Moieties in Southern California. *University of California Publications in American Archaeology and Ethnology* 23(1):1-122.

Gilreath, Amy J.
2007 Rock Art in the Golden State: Pictographs and Petroglyphs, Portable and Panoramic. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 273-290. Alta Mira Press, New York.

Gilreath, Amy J. and William R. Hildebrandt
1997 Prehistoric Use of the Coso Volcanic Field. *Contributions of the University of California No.* 56. University of California, Berkeley.

2008 Coso Rock Art within its Archaeological Context. *Journal of California and Great Basin Anthropology* 28(1):1–22.

2011 Current Perspectives on the Production and Conveyance of Coso Obsidian. In *Perspectives on Prehistoric Trade and Exchange in California and the Great Basin*, edited by Richard E. Hughes, pp. 171–188. University of Utah Press, Salt Lake City.

Goebel, Ted, Michael R. Waters, and Dennis H. O'Rourke
2008 The Late Pleistocene Dispersal of Modern Humans in the Americas. *Science* 319(5869):1497–1502.

Gold, Alan (Garfinkel)
2005 Linguistic Archaeology: Prehistoric Population Movements and Cultural Identity in the Southwestern Great Basin and far southern Sierra Nevada. Ph.D. dissertation. Department of Prehistoric Forager Ecology. University of California, Davis.

Goldsmith, Paul and Alan P. Garfinkel
2013 *Talking Stone: Rock Art of the Cosos*. E-book, documentary film and photographic archive. Bradshaw Foundation, London.

Grant, Campbell, James. W. Baird, and J. Kenneth. Pringle
1968 Rock Drawings of the Coso Range, Inyo County, California: An Ancient Sheep-hunting Cult Pictured in Desert Rock Carvings. *Maturango Museum Publication* 4. China Lake, California.

Grayson, Donald K.
2011 *The Great Basin: A Natural Prehistory*. Revised and expanded edition. University of California Press, Berkeley.

Gross, Lorraine S., Kevin J. Peter and William B. Gilmour
1987 Cultural and Paleontological Resource Investigations of the Lakes at San Antonio Project, City of Upland, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Hammond, Steve
1989 Site Record for P36-000625. On file, South Central Coastal Information Center, California State University, Fullerton.

Harrington, John P.
1986 *John P. Harrington Papers, Volume 3: Southern California / Basin*. Washington: Smithsonian Institution, National Anthropological Archives. [Microfilm edition, Millwood, New York, Kraus, International Publications].

Harrington, Mark R.
1948a An Ancient Site at Borax Lake, California. *Southwest Museum Papers* 16. Southwest Museum, Los Angeles.

1948b A New Pinto Site. *Masterkey* 22(4):116-118.

1949 A New Pinto Site at Little Lake. *Masterkey* 23(5):135-136.

1950a Pinto Man at Little Lake. *Desert Magazine* 13(11):22-24. Los Angeles.

1950b A Storage Cave Near Walker Pass. *Masterkey* 24(3):89-90.

1951 A Colossal Quarry. *Masterkey* 25(1):15-18.

1952 The Fossil Falls Site. *Masterkey* 26(6):191-195.

1953 A Cave Near Little Lake. *Masterkey* 27(3):77-82.

1957 A Pinto Site at Little Lake, California. *Southwest Museum Papers* No. 17.

Haynes, Gregory M.
2004 An Evaluation of the Chronological Relationship between Great Basin Stemmed and Pinto Series Projectile Points in the Mojave Desert. In *Proceedings of the Millennium Conference*: *The Human Journey and Ancient Life in California's Deserts: Proceedings from the 2001 Millennium Conference*, edited by Mark W. Allen and Judyth Reed, pp. 117–128. Maturango Museum Publication Number 15, Ridgecrest, California.

Hedges, Ken
2001 Traversing the Great Gray Middle Ground: An Examination of Shamanistic Interpretations of Rock Art. *American Indian Rock Art* 27:123–136.

Heizer, Robert F. and Martin A. Baumhoff
1961 The Archaeology of Wagon Jack Shelter. *University of California Anthropological Records* 20(4):119-138. Berkeley.

Heizer, Robert F., Martin A. Baumhoff, and C. William Clewlow, Jr.
1968 Archaeology of South Fork Shelter (NV-EL-11), Elko County, Nevada. *University of California Archaeological Survey Reports* 71:1-58. Berkeley.

Heizer, Robert F. and Thomas R. Hester
1978 Great Basin. In *Chronologies in New World Archaeology*, edited by R. Ervin Taylor and Clement W. Meighan, pp. 147-199. Academic Press, New York.

Hildebrandt, William R. and Kelly R. McGuire
2002 The Ascendance of Hunting during the California Middle Archaic: An Evolutionary Perspective. *American Antiquity* 67(2):231–256.

ICF International
2013 Archaeological Survey Report for the High Desert Corridor, Los Angeles and San Bernardino Counties, California, 07-LA/ 08-SBD, SR-14 to SR-18. EA 116720. On file, South Central Coastal Information Center, California State University, Fullerton.

Johnson, John R. and Joseph G. Lorenz
2006 Genetics, Linguistics, and Prehistoric Migrations: An Analysis of California Indian Mitochondrial DNA Lineages. *Journal of California and Great Basin Anthropology* 26(1):33-64.

Justice, Noel D.
2002 *Stone Age Spear and Arrow Points of California and the Great Basin*. Indiana University Press, Bloomington, Indiana.

Kaiser, Kathryn H.
1973 Point of Historical Interest, "Baseline Road". On file, South Central Coastal Information Center, California State University, Fullerton.

Kelly, Robert L.
1983 Hunter-Gatherer Mobility Strategies. *Journal of Anthropological Research* 39:277–306.

1985 *Hunter-Gatherer Mobility and Sedentism: A Great Basin Study*. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

1988 Three Sides of a Biface. *American Antiquity* 53:717–734.

King, Chester
2003 *Japchibit Ethnohistory*. On file at the United States Department of Agriculture, Angeles National Forest.

Kroeber, Alfred. L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington, D.C.

Kyle, D.E.
1990 *Historic Spots in California*. Palo Alto: Stanford University Press.

Lamb, Sydney
1958 Linguistic Prehistory in the Great Basin. *International Journal of American Linguistics* 24(2):95–100.

Lanning, Edward P.
1963 The Archaeology of the Rose Spring Site (INY-372). *University of California Publications in American Archaeology and Ethnology* 49(3):327–336. Berkeley.

Leakey, Louis S. B., Ruth D. Simpson, and Thomas Clements
1968 Excavations at Nine Prehistoric Sites in in the Calico Mountains, California: Preliminary Report. *Science* 160:1022–1033.

Lengner, Kenneth R.
2013 *A Prehistory and History of the Death Valley Region's Native Americans and the Environments IN Which They Lived.* Deep Enough Press, Pahrump, Nevada.

McGuire, Kelly R. and Alan P. Garfinkel
1976 The Development of Pinyon Exploitation in Central Eastern California. *The Journal of California Anthropology* 3(2):83–85.

1980 Archaeological Investigations in the Southern Sierra Nevada: The Bear Mountain Segment of the Pacific Crest Trail. *Cultural Resources Publication, Archaeology*. Bureau of Land Management, Bakersfield, California. Reprinted by Coyote Press, Salinas, California.

McGuire, Kelly R., Alan P. Garfinkel, and Mark E. Basgall
1982 Archaeological Investigations in the El Paso Mountains of the Western Mojave Desert: The Bickel and Last Chance Sites, CA-Ker-250, -261. On file, Bureau of Land Management, Ridgecrest, California.

McGuire, Kelly R. and William R. Hildebrandt
2005 Re-thinking Great Basin Foragers: Prestige Hunting and Costly Signaling During the Middle Archaic Period. *American Antiquity* 70:695–712.

Mehringer, Peter J., Jr. and J. C. Sheppard
1978 Holocene History of Little Lake, Mojave Desert, California. In *The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country*, edited by Emma Lou Davis, pp. 153-166. Natural History Museum of Los Angeles County, Science Series 29.

Meyer, Jack and Jeffrey S. Rosenthal
2010 Filling the Middle Holocene Gap. *California Archaeology* 2(2):279–283.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moratto, Michael, Garfinkel, Alan P., Robert M. Yohe, II, Alexander K. Rogers, Tim R. Carpenter, Craig Skinner, Jeff Rosenthal, Michael F. Rondeau, and Jon M. Erlandson
2018 Clovis in the Far West: Classification and Chronology of Western Fluted and End-thinned Points from the Rose Valley Sites, Inyo County, California. *Journal of California Archaeology* 10(1):27-60.

O'Connell, J. F.
1967 Elko Eared/Elko Corner-notched Projectile Points as Time Markers in the Great Basin. *University of California Archaeological Survey Reports* 70:129-140. Berkeley.

Robinson, Roger
1977 The Prehistory of the Antelope Valley, California. An Overview. *Kern County Archaeological Society Journal* 1:43-48.

Rogers, Malcolm J.
1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. *San Diego Museum of Man Archaeological Papers* 3. San Diego, California.

1966 How Stones Became Tools and Weapons. In *Ancient Hunters of the Far West*, pp. 139–192. Union-Tribune Publishing Company, San Diego.

Rondeau, Michael, Jim Cassidy, and Terry L. Jones
2007 Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/ Microblade Complex. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 63-70. Alta Mira Press, Lanham, Maryland.

Sample, L. L.
1950 Trade and Trails in Aboriginal California. Berkeley: *University of California Archaeological Survey Reports* 8.

Schneider, Joan S., H. C. L. Brewer, and Matthew C. Hall
2000 Research, Inventory, and Management Strategies for At-Risk and Other Prehistoric Cultural Resources, Death Valley National Park, California: Program Design Report. On file, Eastern California Information Center, University of California, Riverside.

Schroth, Adella B.
1994 *The Pinto Point Controversy in the Western United States*. Ph.D. dissertation, Department of Anthropology, University of California, Riverside, California.

Schuiling, Walter C.
1984 *San Bernardino County: Land of Contrasts*. Windsor Publications, Woodland Hills, California.

Shott, Michael J.
1986 Technological Organization and Settlement Mobility: An Ethnographic Examination. *Journal of Anthropological Research* 42(1):15–51.

1989 On Tool-Class Use Lives and the Formation of Archaeological Assemblages. *American Antiquity* 54(1):9–30.

Sider, W.A.
1976 Cucamonga Creek 1776-1976 after 200 Years. On file, South Central Coastal Information Center, California State University, Fullerton.

Stewart, Richard, Russell Kaldenberg, and Alexander Rogers
2005 Petroglyphs as Story-Boards: Providing Text for Ritual and Tradition and Recounting the "Power" Experience. In Something Resembling an Archaeologist: Papers in Memory of Paul H. Ezell, edited by Russell Kaldenberg. *San Bernardino County Museum Quarterly* 54(4):209-220. San Bernardino County Museum; Redlands,

Strong, William Duncan
1929 Aboriginal Society in Southern California. *University of California Publications in American Archaeology and Ethnology* 26(1):1-358.

Sutton, Mark Q.
1980 Some Aspects of Kitanemuk Prehistory. *Journal of California and Great Basin Anthropology* 2(2):214-225.

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen
2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 229-246. Alta Mira Press, New York.

Tang, Bai
2016 Due-Diligence Historical/Archaeological Resources Study Inland Empire Utilities Agency Recharge Basin Maintenance Plan Chino Basin Area, San Bernardino and Riverside Counties, California CRM TECH Contract No. 2989. On file, South Central Coastal Information Center, California State University, Fullerton.

Thomas, David H.
1981 How to Classify the Projectile Points from Monitor Valley, Nevada. *Journal of California and Great Basin Anthropology* 3(1):7-43.

1983a The Archaeology of Monitor Valley 1: Epistemology. *Anthropological Papers of the American Museum of Natural History* 58(1). American Museum of Natural History, New York.

1983b The Archaeology of Monitor Valley 2: Gatecliff Shelter. *Anthropological Papers of the American Museum of Natural History* 59(1). American Museum of Natural History, New York.

Ugan, Andrew S. and Jeffrey S Rosenthal
2013a Archaeological Testing and National Register Evaluations of 40 Sites within Airport Lake, Charlie, and George Target Ranges, Naval Air Weapons Station China Lake, Inyo and Kern Counties, California. Submitted by Far Western Anthropological Research Group, Inc., Davis, California. On file, Naval Facilities Engineering Command, Southwest Division, San Diego, California.

Van Tilburg, Jo Anne, Gordon E. Hull, and John C. Bretney (editors)
2012 *Rock Art at Little Lake: An Ancient Crossroads in the California Desert*. Cotsen Institute of Archaeology, University of California, Los Angeles.

Vaughan, Sheila J. and Claude N. Warren
1987 Toward a Definition of Pinto Points. *Journal of California and Great Basin Anthropology* 9:199–213.

Wallace, William J.
1962 Prehistoric Cultural Development in the Southern Californian Deserts. *American Antiquity* 28(2):172–180.

Warren, Claude N.
1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2):168–185.

1984 The Desert Region. In *California Archaeology*, by Michael J. Moratto, pp. 339–430. Academic Press, Orlando, Florida.

1986 Projectile Points. *In Flood, Sweat, and Spears in the Valley of Death: Site Survey and Evaluation in Tiefort Basin, Fort Irwin, California*, edited by Dennis L. Jenkins, pp. 195–218. Coyote Press, Salinas, California.

2008 The Age of Clovis Points at China Lake, California. In Avocados to Millingstones: Papers in Honor of D. L. True, edited by Georgie Waugh and Mark E. Basgall. *Monographs in California and Great Basin Anthropology* Vol. 5, Archaeological Research Center, Department of Anthropology, California State University, Sacramento.

Warren, Claude N. and Robert H. Crabtree
1986 Prehistory of the Southwestern Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 183–193. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.

Warren, Claude N. and Joan S. Schneider
2003 Pleistocene Lake Mojave Stratigraphy and Associated Cultural Material. *Proceedings of the Society for California Archaeology* 16:61–74.

Warren, Claude N., Delbert Leroy True and A. A. Eudey
1961 Early Gathering Complexes of Western San Diego County: Results and Interpretations of an Archaeological Survey. *University of California, Los Angeles, Archaeological Survey Annual Report* 1960-1961:1-106.

Waters, Michael R. and Thomas W. Stafford
2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* 315:1122–1126.

Waters, Michael R., Thomas W. Stafford, H. G. McDonald, C. Gustafson, M. Rasmussen, E. Cappellini, J. V. Olsen, D. Szklarczyk, L. J. Jensen, M. Thomas P. Gilbert, and E. Willerslev
2011 Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington. *Science* 334:351–353.

Whitley, David S.
1987 Comment on the Signs of All Times by J. D. Lewis-Williams and T. A. Dowson. *Current Anthropology* 29(2):238.

1998 History and Prehistory of the Coso Range: The Native American Past on the Western Edge of the Great Basin. In *Coso Rock Art: A New Perspective*, edited by Eva Younkin, pp. 29-68. Ridgecrest: Maturango Press.

2003 What is Hedges Arguing About? *American Indian Rock Art* 29:83-104.

Whitley, David S. and Ronald I. Dorn
1987 Rock Art Chronology in Eastern California. *World Archaeology* 19:150-164.

2010 The Coso Petroglyph Chronology. *Pacific Coast Archaeological Society Quarterly* 43: 135-157.

Wigand, Peter E. and Rhode, David
2002 Great Basin Vegetation history and aquatic systems: The last 150,000 years. In *Great Basin Aquatic Systems History*, edited by R. Hershler, David R. Madsen, and D. R. Currey, Smithsonian Contributions to the Earth Sciences 33:309.

Willig, Judith A. and C. Melvin Aikens
1988 The Clovis-Archaic Interface in Far Western North America. In Early Human Occupation in Western North America: The Clovis-Archaic Interface, edited by Judith A. Willig, C. Melvin Aikens and John L. Fagan, pp. 1–40. *Nevada State Museum Anthropological Papers.* Vol. 21. Carson City, Nevada.

Wilmoth, Stan
1979 Environmental Impact Evaluation: An Archaeological Assessment of Both Sides of Sixteenth Street (Baseline) in the City of Upland, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

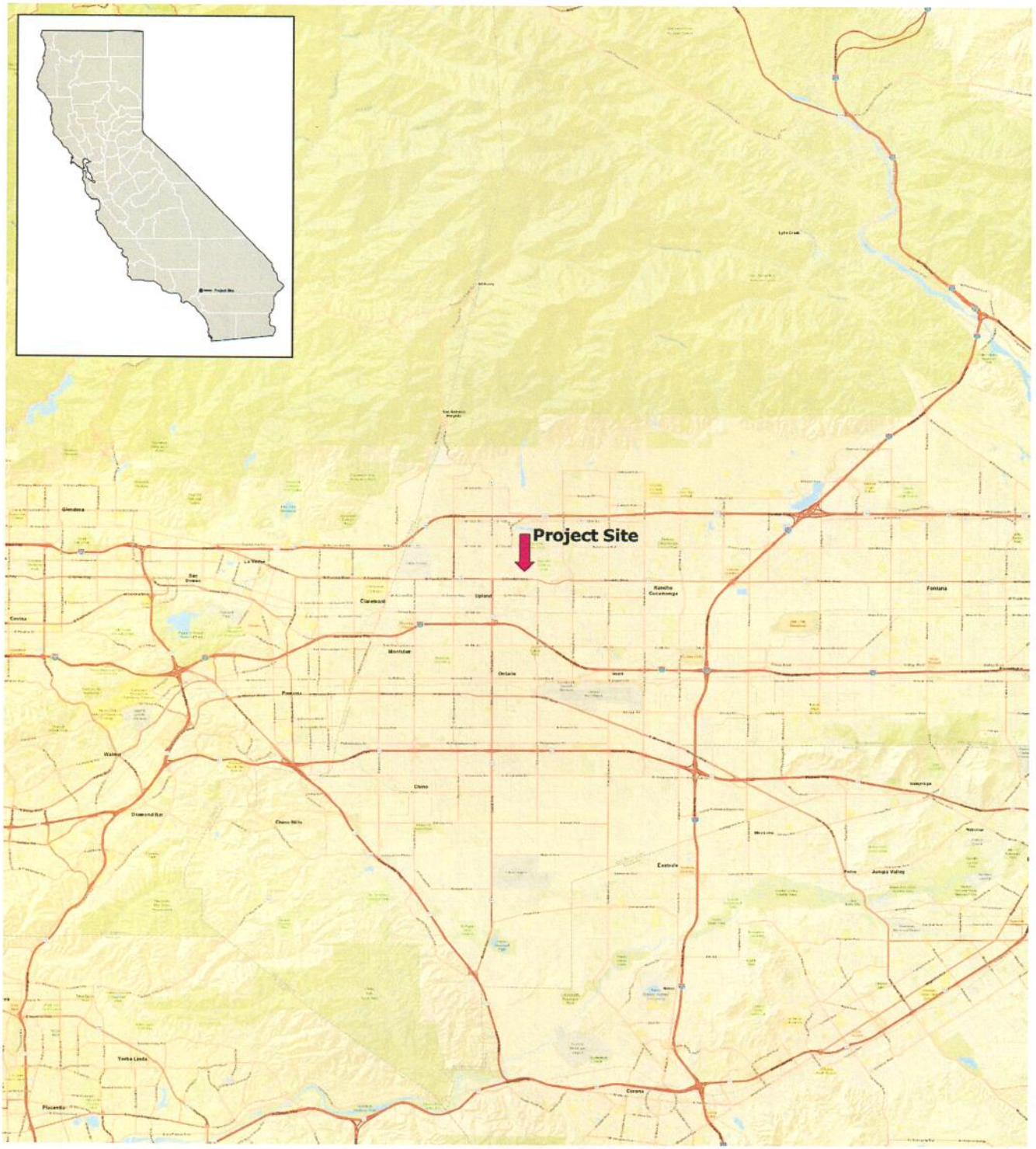
Wlodarski, Robert J.
2008 Bechtel Wireless Telecommunications Site ES0258 (Upland Water Tanks) located at 580 East 15th Street, Upland, California 91785. On file, South Central Coastal Information Center, California State University, Fullerton.

Yohe, Robert, II
1992 A Re-evaluation of Western Great Basin Cultural Chronology and Evidence for the Timing of the Introduction of the Bow and Arrow to Eastern California Based on New Excavations at the Rose Spring Site (CA-INY-372). Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

# APPENDIX A
# FIGURES

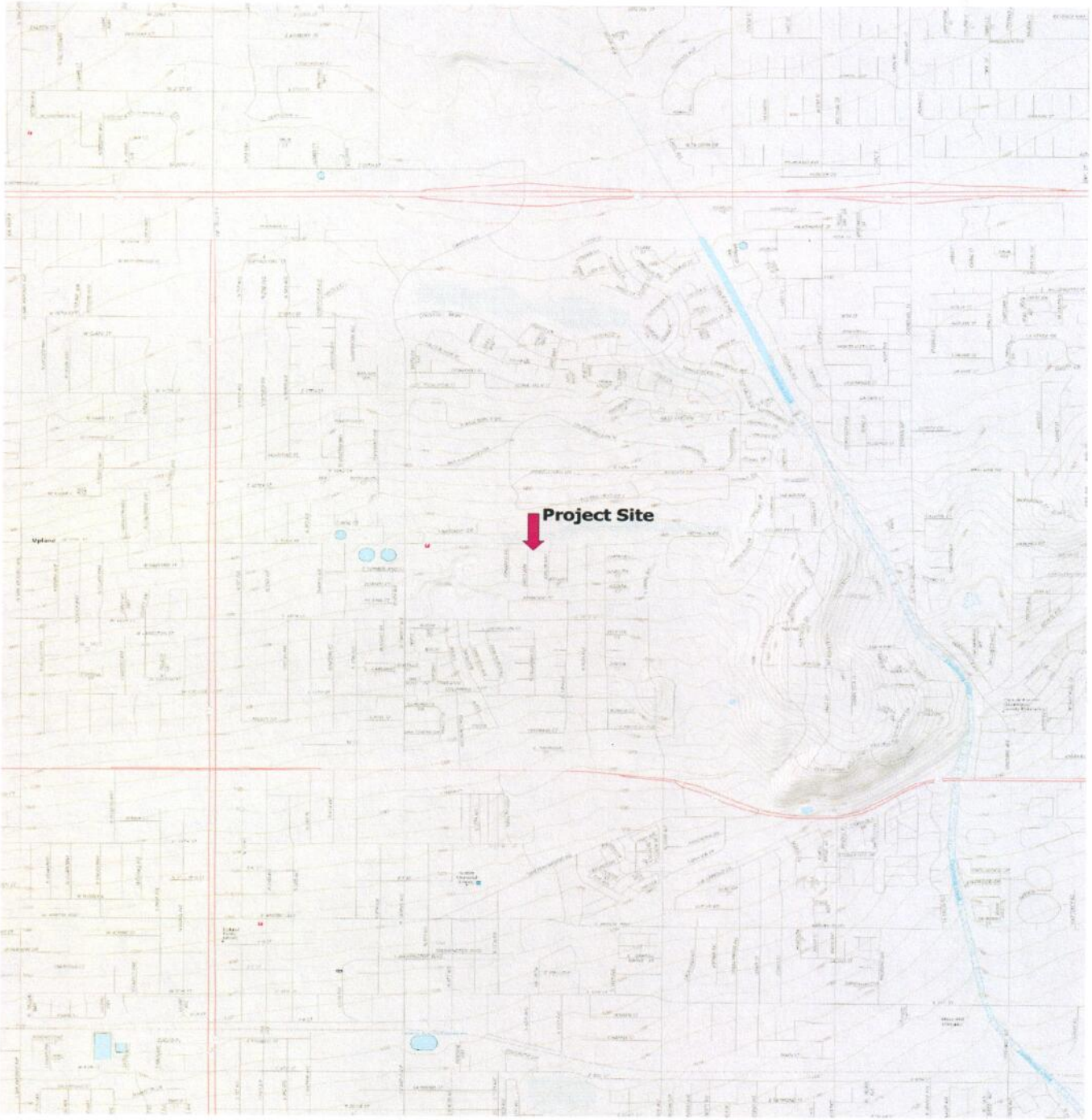
# Figure 1

Regional Vicinity Map



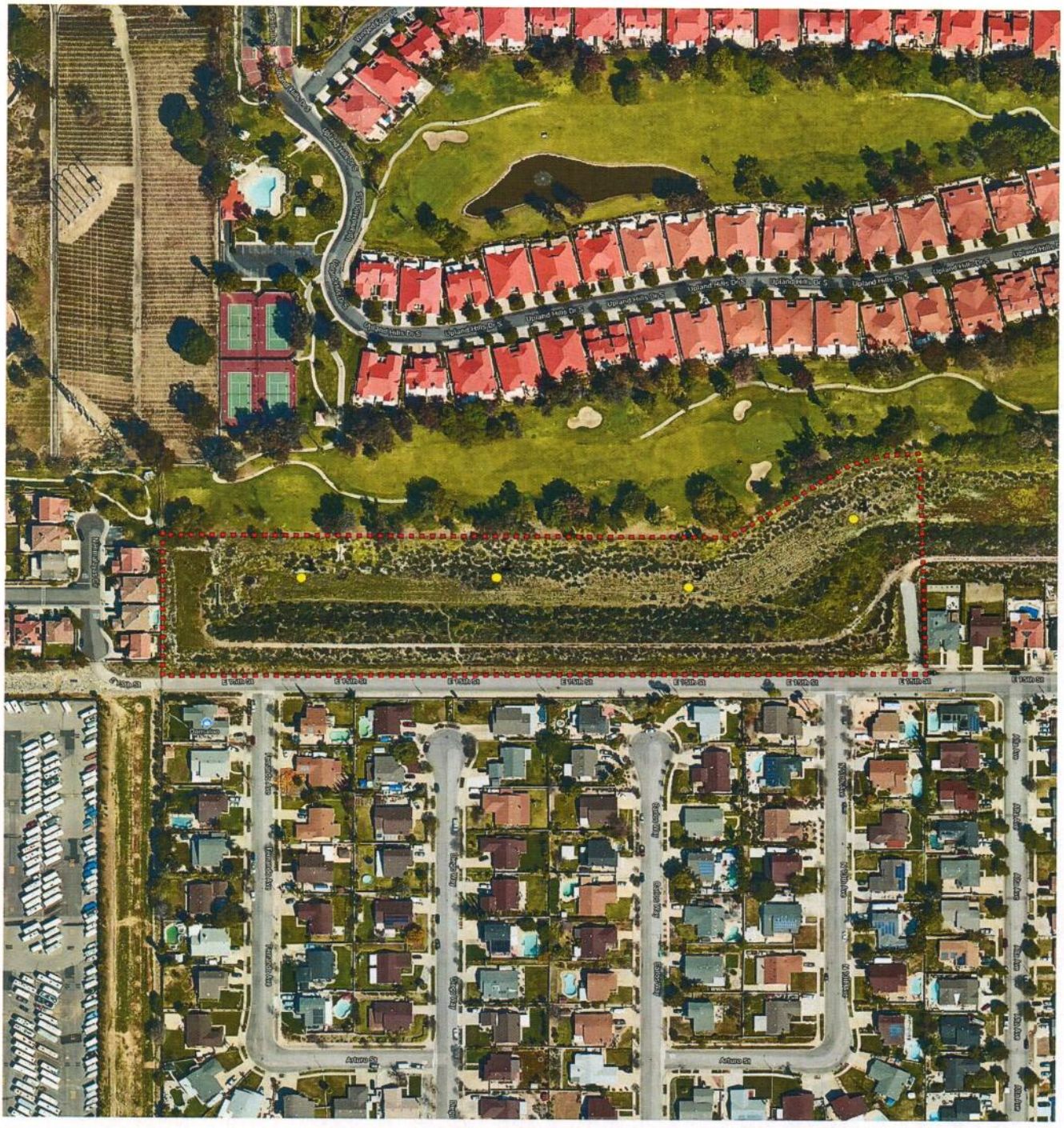
# Figure 2

Topographic Map

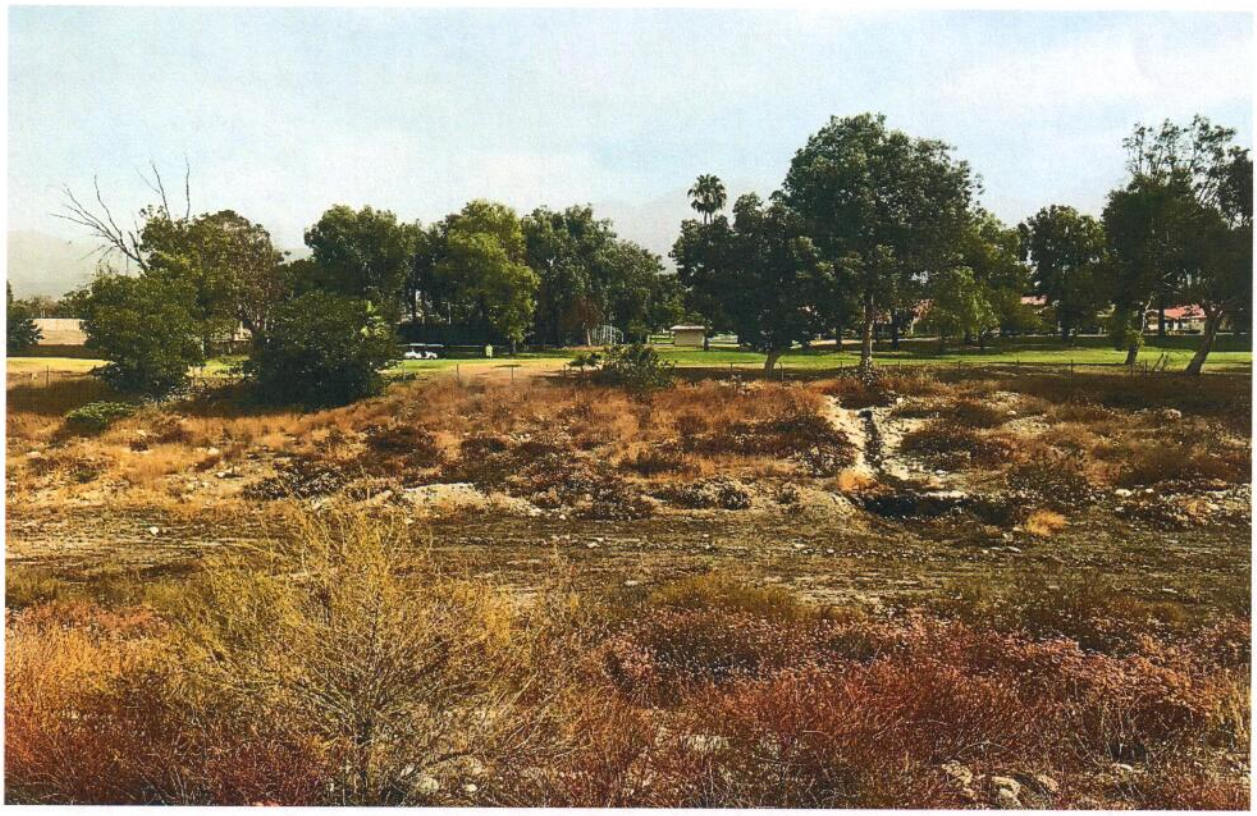


# Figure 3

Cultural Shovel Test Pit Locations



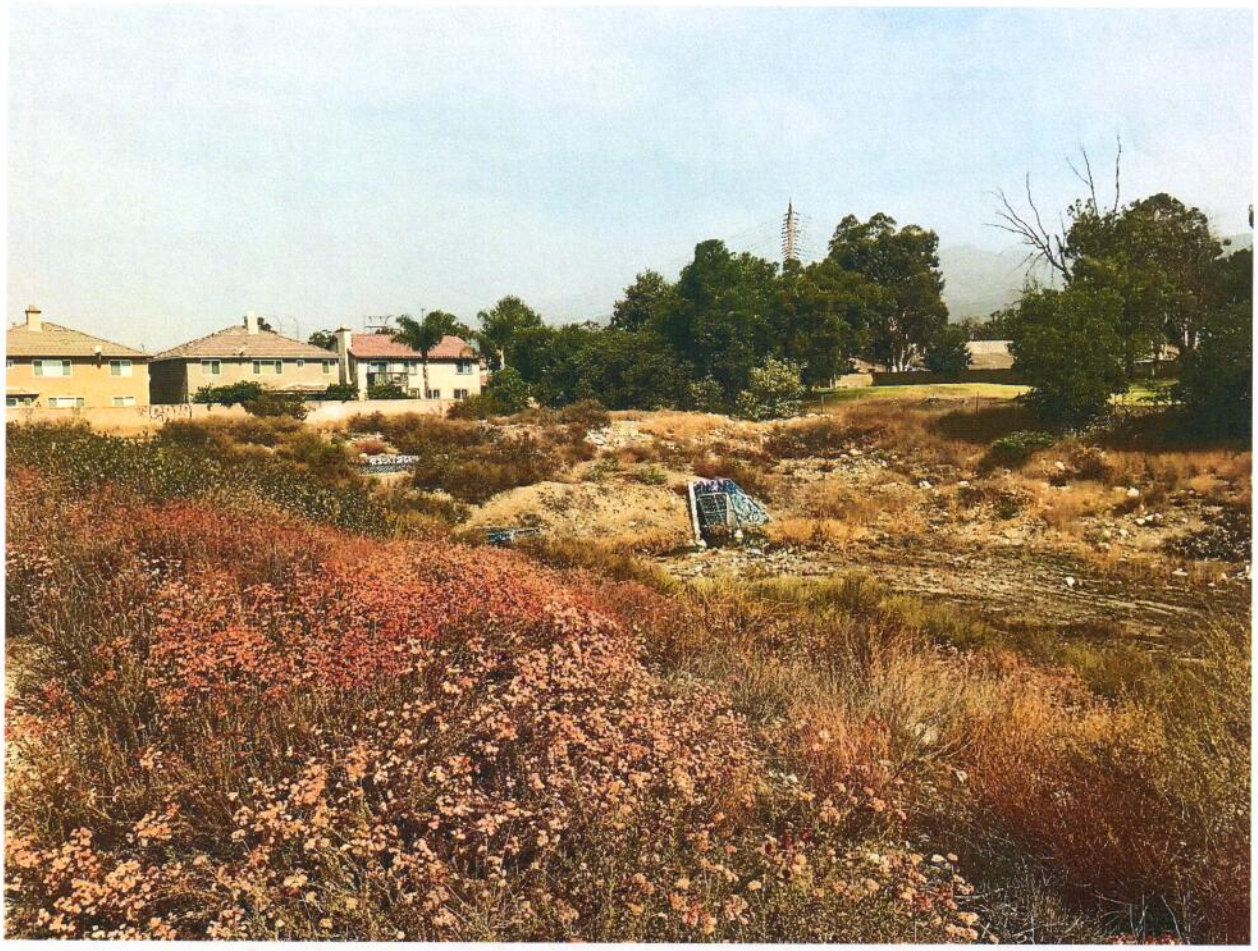
# SITE PHOTOS



View North



View East



View West



Channel Water

# APPENDIX B
# NATIVE AMERICAN CONSULTATION

# Sacred Lands File & Native American Contacts List Request

**Native American Heritage Commission**
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

*Information Below is Required for a Sacred Lands File Search*

**Project** Frontier communities development

**County:** San Bernardino

**USGS Quadrangle Name:** Ontario, California 2015 7.5 USGS

**Township:** 1 south **Range:** 7 west **Section(s):** 5

**Company/Firm/Agency:** RCA Associates/ Frontier Communities/ City of Upland

**Street Address:** APNs (1045-151-34) (1045-121-02) (0207-483-46) North of 15th street

**City:** Upland **Zip:** 92407

**Phone**: 760-596-0017

**Fax:** 760-956-9212

**Email:** alinalanda@ymail.com

**Project Description**: Frontier Homes development on a currently vacant real estate property approximately 9.16 acres.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

**NATIVE AMERICAN HERITAGE COMMISSION**
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

June 15, 2018

Alina Landa
RCA Associates

Sent by E-mail: alinalanda@ymail.com

RE: Proposed Frontier Communities Upland Colonies 59 Development Project, City of Upland; Ontario USGS Quadrangle, San Bernardino County, California

Dear Ms. Landa:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

**CONFIDENTIALITY NOTICE:** This communication with its contents may contain confidential and/or legally privileged information. It is solely for the use of the intended recipient(s). Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

**Native American Heritage Commission**
**Native American Contact List**
**San Bernardino County**
**6/15/2018**

***Gabrieleno Band of Mission Indians - Kizh Nation***
Andrew Salas, Chairperson
P.O. Box 393
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org
Gabrieleno

***Gabrieleno/Tongva San Gabriel Band of Mission Indians***
Anthony Morales, Chairperson
P.O. Box 693
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com
Gabrieleno

***Gabrielino /Tongva Nation***
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com
Gabrielino

***Gabrielino Tongva Indians of California Tribal Council***
Robert Dorame, Chairperson
P.O. Box 490
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com
Gabrielino

***Gabrielino-Tongva Tribe***
Charles Alvarez,
23454 Vanowen Street
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com
Gabrielino

***Morongo Band of Mission Indians***
Robert Martin, Chairperson
12700 Pumarra Rroad
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov
Cahuilla
Serrano

***Morongo Band of Mission Indians***
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov
Cahuilla
Serrano

***Pauma Band of Luiseno Indians - Pauma & Yuima Reservation***
Temet Aguilar, Chairperson
P.O. Box 369
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com
Luiseno

***San Fernando Band of Mission Indians***
Donna Yocum, Chairperson
P.O. Box 221838
Newhall, CA, 91322
Phone: (503) 539 - 0933
Fax: (503) 574-3308
ddyocum@comcast.net
Kitanemuk
Serrano
Tataviam

***San Manuel Band of Mission Indians***
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov
Serrano

***Serrano Nation of Mission Indians***
Goldie Walker, Chairperson
P.O. Box 343
Patton, CA, 92369
Phone: (909) 528 - 9027
Serrano

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Frontier Communities Upland Colonies 59 Development Project, San Bernardino County.

RCA
ASSOCIATES INC

15555 Main Street, #D4-235
Hesperia, California 92345
(760) 956-9212 fax (760) 244-0791
rca123@aol.com
www.rcaassociatesllc.com

June 21, 2018

Donna Yocum, Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, CA 91322

Dear Ms. Yocum,

I am writing you to bring to your attention a proposed project in compliance with CEQA and the City of Upland, California. The proposed project is located on APNs (1045-151-34) (1045-121-02) and (0207-483-46). (Township 1 south, Range 7 west, Section 5) Ontario, California USGS 2015. The proposed project by Frontier Communities is to construct single-family home developments located north of 15th street.

As part of the cultural resources study for the project, I am requesting your insight on potential Native American cultural properties and resources in or near the area of potential effect. Please respond at your earliest convenience if you have any information to consider for this study. Thank you.

Respectfully,

Alina Landa
Cultural Resources Specialist
RCA Associates, Inc.
alinalanda@ymail.com

# RESUMES

Dr. Alan Philip Garfinkel Gold, R.P.A.
avram1952@yahoo.com
805.312.2261

**Positions:**

Principal Archaeologist
RCA Associates, LLC
Hesperia, California

Founder and Director
California Rock Art Foundation
http://www.carockart.org

Senior Cultural Resource Specialist
AECOM (http://www.aecom.com)
Camarillo, California (Total time 3 years)

Freelance Cultural Resource Management Consultant
(Total time 20 years)

Environmental Planner, Cultural Resources
California Department of Transportation
(Total time 18 years)

**Education:**

Bachelor of Arts, Department of Anthropology, California State University, Northridge, (*magna cum laude*), 1974
Master of Arts, Department of Anthropology, University of California, Davis, 1977
Doctor of Philosophy, Prehistoric Forager Ecology, University of California, Davis, 2005

**Representative Cultural Resource Management Projects**

Cultural Resource Management Director for North Sky Wind Energy Project. Identified 76 cultural resource sites. Collected, excavated and documented sites including intensive data recovery effort resulting in a collection of 5,000 artifacts. Managed up to 25 Native American Monitors concurrently for the 102 wind turbine 15,000 acre study area. Resulted in project approval through NEPA and CEQA complaince and approved federal tax credit. Senior author for the resulting 2,769 page report.

Identification and evaluation of potential effects for the Red Rock Canyon Bridge Replacement Project. Identified and evaluated historic properties within the project area, developed historic background for the Red Rock Railroad historic resource. Completed Historic Property Survey Report including the documentation of identification (Prehistoric Archaeological and Historic Archaeological Survey) and evaluation efforts (Geoarchaeological Study). Consultation completed with local museums, Red Rock Canyon State Park, Native American Heritage Commission (NAHC) and Native American groups identified. Area had been listed as a Sacred Site by NAHC. Result: no historic properties within area of potential effects (APE).

Black Creek Site (CA-CAL-789) eligibility evaluation, testing, data recovery, and public interpretation. Contracted with Far Western and Sonoma State for data recovery and construction phase of systematic late discovery identification. Coordinated and consulted with Advisory Council, State Historic Preservation Office, the Army Corps of Engineers, and the Calaveras Band of Mi-Wuk. Significant and eligible site fully mitigated from adverse effects

of road realignment through data recovery and public interpretation projects that included website, interpretive booklet, public presentations at conferences and public schools.
Project received California Governor's Award for Historic Preservation in 2008.

The Applegate Site (CA-AMA-56) eligibility, data recovery, negotiation of reburial arrangement with the Ione Band of the Miwok, presentation of history and character of cultural resource studies in public program sponsored by Far Western Anthropological Research Group, State Historic Preservation Office, California Department of Transportation, and the Ione Band of the Miwok. Worked out program for dealing with eligible site that had received impacts from Caltrans over the course of 50 years of impacts. Dealt with major issues with human remains and associated mortuary offerings.

East Sonora Bypass archaeological studies. Developed program to mitigate adverse effects of numerous eligible historic and prehistoric archaeological sites. Consultation with Mi-Wuk on one of the most controversial Caltrans projects in the history of their cultural resource program due to the pattern of late discoveries and lack of thorough consultation with Native Americans. Coordination with State Historic Preservation Office concerning Memorandum of Agreement, Data Recovery Program, Programmatic Agreement, and Treatment Plan, Supplemental Historic Property Survey Report.

Development of a management plan and National Register nomination for the Fossil Falls/Little Lake Archaeological District for the Bureau of Land Management. Resulted in protective actions, road closures, interpretation, and identification of resources for inclusion in the National Register nomination and the resulting report was published by the Bakersfield District Office of the Bureau of Land Management.

Project Archaeologist with the Desert Planning Staff, Bureau of Land Management, Riverside, California.

Alina Landa
alinalanda@ymail.com
(909) 543-9442

## Experience

**RCA Associates, Inc., Victorville, California** **January 2017-Present**
**Cultural Resources Specialist**

Survey properties in the California high desert region. Correspond with Native American Tribes. Contact Native American Heritage Commission and California Historical Resources Information Center. Prepare CEQA Phase I cultural reports under a certified archaeologist.

## Education

**Cal Poly Pomona, Pomona, California** **June 2016**
Bachelor of Science, General Anthropology
Cultural Resource Management, Applied Anthropology

**Chaffey College, Rancho Cucamonga, California** **June 2013**
Associate of Arts: Social Sciences

## Relevant Coursework

**Archaeology Field Class, Lake Arrowhead, California** **Spring 2015**
Conducted excavations in a small group overseen by Dr. Mark W. Allen.
Documented unit elevations and used basic excavations skills such as troweling and dry screening.

**Cultural Resources Management Class** **Winter 2015**
Studied the basic laws regarding the protection of historic properties.
Involved in a group effort to nominate the Santa Anita Racetrack to be on the National Register of Historic Properties.

**California Archaeology Class** **Winter 2015**
Presented research paper on human behavioral ecology during the Medieval Climatic Anomaly.
Studied prehistoric California culture ways to understand subsistence patterns and inter-tribal communications.

## Leadership

**San Bernardino County Library Page, Fontana, California** **June 2017- Present**
Lewis Library and Technology Center
**San Bernardino County Museum Volunteer** **February 2016- June 2016**

# APPENDIX D:

# GEOTECHNICAL AND INFILTRATION INVESTIGATION

# GEOTECHNICAL AND INFILTRATION EVALUATION
# FOR
# PROPOSED SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
# ASSESSOR'S PARCEL NUMBERS (APNS) 1045-121-02 & 1045-151-34
# UPLAND COLONIES 59
# NORTH OF EAST 15TH STREET
# UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA

**PREPARED FOR**

**FRONTIER ENTERPRISES**
**2151 EAST CONVENTION CENTER WAY, SUITE 100**
**ONTARIO, CALIFORNIA 91764**

**PREPARED BY**

**GEOTEK, INC.**
**1548 NORTH MAPLE STREET**
**CORONA, CALIFORNIA 92880**

**PROJECT NO. 1925-CR** **JULY 12, 2018**

GEOTEK

GeoTek, Inc.
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July 12, 2018
Project No. 1925-CR

**Frontier Enterprises**
2151 East Convention Center Way, Suite 100
Ontario, California 91764

Attention: Mr. Daniel Pocius

Subject: Geotechnical and Infiltration Evaluation
Proposed Single-Family Residential Development
Assessor's Parcel Numbers (APNs) 1045-121-02 & 1045-151-34
Upland Colonies 59
Upland, San Bernardino County, California

Dear Mr. Pocius:

We are pleased to provide the results of our geotechnical evaluation for the subject property located in Upland, San Bernardino County, California. This report presents a discussion of our evaluation and provides preliminary geotechnical recommendations for earthwork, foundation design, and construction.

In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations presented in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service is sincerely appreciated. If you have any questions, please do not hesitate to call our office.

Respectfully submitted,
**GeoTek, Inc.**







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Distribution: (1) Addressee via email (one PDF file)

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Appendix B – Laboratory Testing Results
Appendix C – Infiltration Test Data
Appendix D – General Earthwork Grading Guidelines

# 1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical conditions for the proposed improvements. Services provided for this study included the following:

- Research and review of available geologic data and general information pertinent to the site,
- A site reconnaissance,
- Excavation of eight exploratory trenches on-site,
- Infiltration testing in two shallow exploratory trenches on-site,
- Collection of soil samples of the on-site materials,
- Laboratory testing of selected soil samples collected from the site,
- Review and evaluation of site seismicity, and;
- Compilation of this geotechnical report which presents our preliminary recommendations for site development.

The intent of this report is to aid in the evaluation of the site for future proposed development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report will likely need to be updated based upon our review of the final site development plans. These plans should be provided to GeoTek, Inc. (GeoTek) for review when available.

# 2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

## 2.1 SITE DESCRIPTION

The site is located north of East 15$^{th}$ Street in the city of Upland. The irregular-shaped site is approximately 9.16 acres in size. The site is currently vacant land with no visual indication of previous structural improvements. However, based on a review of aerial photography, the site appears to be part of a storm water basin.

The site is in an area largely residentially developed. The site is bounded by an existing golf course to the north, residential developments to the south and west and vacant land and the golf course to the east and northeast. An electrical substation is located further to the west.

Based on information provided to us by the client, it is our understanding the proposed improvements include a single-family residential development consisting of 57 residential building pads, several storm water basins and associated roadways.

Specific structural loading was not provided to us. Therefore, this report has been prepared based on the proposed residential structures will be of wood-frame construction, two-stories and less and incorporate a concrete slab-on-grade floor.

Based on topographic information provided, the elevation of the site ranges from about El. 1413 within the bottom of the existing basin to about El. 1430 along the top of the ascending slopes. The existing slopes appear to be inclined at ratios of about 3:1 (horizontal:vertical). Although proposed site grades have not been provided, we anticipate that the existing basin will be filled so that the new buildings will be close to adjacent development site grades. Accordingly, we anticipate cuts and fills up to about 15 feet in thickness.

If site development differs from the information presented in this report, the recommendations should be subject to further review and evaluation by GeoTek. Final site development plans should be reviewed by GeoTek when they become available.

# 3. FIELD EXPLORATION AND LABORATORY TESTING

## 3.1 FIELD EXPLORATION

Our geotechnical field exploration was conducted on June 28, 2018. A geologist from GeoTek logged eight exploratory test trenches excavated with a backhoe. The trenches were located within the vicinity of the proposed improvements (see Trench Location Map, Figure 2). Logs of the exploratory trenches are included in Appendix A. Samples of on-site soils encountered in the excavations were returned to the laboratory for testing and evaluation.

## 3.2 INFILTRATION TEST INFORMATION

Two test trenches (T-4 and T-8) were excavated to a depth of approximately four feet below the existing ground surface within proposed storm water retention/basin areas as directed to us by the project civil engineer, Proactive Engineering Consultants. A 11-inch diameter test hole was then excavated at the base of the test trench to a depth of about 12 inches. The test holes were then filled with water to pre-soak the test hole. Following pre-soaking, the test holes were filled with water and the drop in water level as the water percolated into the underlying soil was recorded every 6 or 30 minutes. The test was continued for a minimum of twelve readings and the final reading was used in the calculation of the infiltration rate. The field data was converted to an infiltration rate via the Porchet method.

The infiltration rates are presented in the follow table for each of the borings after the rates had stabilized.

| Test No. | Infiltration Rate (inches per hour) |
|---|---|
| T-4 | 20.9 |
| T-8 | 3.48 |

Copies of the percolation data sheets and infiltration conversion sheets (Porchet Method) are included in Appendix C.

Over the lifetime of the storm water disposal areas, the infiltration rates may be affected by silt build up and biological activities, as well as local variations in near surface soil conditions. We recommend that an appropriate factor of safety be applied.

## 3.3 LABORATORY TESTING

Laboratory testing was performed on selected bulk soil samples collected during our field exploration. The purpose of the laboratory testing was to confirm the field classification of the soils encountered and to evaluate their physical properties for use in the engineering design and analysis. Laboratory testing has included expansion index and corrosion potential (pH, resistivity, chloride and sulfate content). Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included in Appendix B or on the exploratory logs included in Appendix A.

# 4. GEOLOGIC AND SOILS CONDITIONS

## 4.1 REGIONAL SETTING

The property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles from the north and northeasterly adjacent the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the property, the is located in an area geologically mapped to be underlain by alluvial fan deposits (Morton, D.M. and Miller F.K., 2006).

## 4.2 GENERAL SOIL/GEOLOGIC CONDITIONS

A brief description of the earth materials encountered at the subject site is presented in the following sections. Based on our field exploration and observations, the site is generally underlain by undocumented fill and alluvium.

### 4.2.1 Undocumented Fill

Undocumented fill was encountered within five of the test trenches to depths ranging from about 2.5 to 6.5+ feet below grade. The undocumented fill encountered consisted of a silty gravelly sand to a silty sand with some cobbles and/or boulders. Trace brick and tile fragments were also observed in the fill within one of the test excavations.

### 4.2.2 Alluvium

Alluvium was encountered at existing grade and/or below the undocumented fill. In general, the alluvial materials encountered typically consist of silty sand, sand and sandy gravel with variable cobble content.

According to the results of the laboratory testing performed, the near-surface alluvial soils exhibited a "very low" expansion potential when tested in accordance with ASTM D 4829. The test results are provided in Appendix B.

## 4.3 SURFACE AND GROUNDWATER

### 4.3.1 Surface Water

Surface water was not observed on the site during our subsurface exploration. If encountered during the earthwork construction, surface water on this site is the result of precipitation. Overall site area drainage is generally by sheet flow in a northerly direction. Provisions for surface drainage will need to be accounted for by the project civil engineer.

### 4.3.2 Groundwater

Groundwater was not encountered in our exploratory excavations. Based on a review of information contained in the State Water Resources Control Board database (http://www.water.ca.gov/waterdatalibrary/) groundwater is estimated to be greater than 100 feet below ground surface.

Based on the results of our field exploration, review of site area geomorphology and geology, groundwater is not anticipated to adversely affect the proposed improvements.

## 4.4 FAULTING AND SEISMICITY

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is presently known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone. The nearest mapped active faults are the Sierra Madre fault, located about 2.6 miles to the north and the Red Hill-Etiwanda fault located about 5.3 miles to the northeast.

Based on a review of the *San Bernardino County Geologic Hazard Overlays* (Sheet FH 27C), the site is not located within a designated fault hazard, liquefaction hazard or landslide hazard area.

### 4.4.1 Seismic Design Parameters

The site is located at approximately 34.1184° Latitude and -117.6332° Longitude. Site spectral accelerations (Ss and $S_1$), for 0.2 and 1.0 second periods for a Class "D" site, were determined from the USGS Website, Earthquake Hazards Program, U.S. Seismic Design Maps for Risk-Targeted Maximum Considered Earthquake ($MCE_R$) Ground Motion Response Accelerations

for the Conterminous 48 States by Latitude/Longitude. The results are presented in the following table:

| SITE SEISMIC PARAMETERS | |
|---|---|
| Mapped 0.2 sec Period Spectral Acceleration, $S_S$ | 1.786g |
| Mapped 1.0 sec Period Spectral Acceleration, $S_1$ | 0.629g |
| Site Coefficient for Site Class "D", $F_a$ | 1.0 |
| Site Coefficient for Site Class "D", $F_v$ | 1.5 |
| Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$ | 1.786g |
| Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$ | 0.944g |
| 5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$ | 1.190g |
| 5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$ | 0.629g |

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

## 4.5 LIQUEFACTION AND SEISMICALLY-INDUCED SETTLEMENT

Based on a review of the San Bernardino County Geologic Hazard Overlay Map (FH 27C-Ontario), the site is not located within a designated liquefaction hazard zone. A review of the groundwater contours noted on the map by Carson and Matti (Carson and Matti, 1985), the depth to groundwater is greater than 200 feet below grade. Groundwater data (http://www.water.ca.gov/waterdatalibrary/) also suggests that groundwater is at a depth greater than 100 feet below existing grade.

Liquefaction is not considered to be a hazard at the subject site due to the great depth to groundwater (greater than 50 feet) and the current geologic hazard mapping.

## 4.6 OTHER SEISMIC HAZARDS

The site is not mapped within a zone of generalized landslide susceptibility per the California Geological Survey. Evidence of ancient landslides or slope instabilities at this site was not observed during our investigation. Thus, the potential for landslides is considered negligible for design purposes.

The potential for secondary seismic hazards such as a seiche or tsunami is considered negligible due to site elevation and distance to an open body of water.

# 5. CONCLUSIONS AND RECOMMENDATIONS

## 5.1 GENERAL

The anticipated site development appears feasible from a geotechnical viewpoint provided that the following recommendations, and those provided by this firm at a later date, are properly incorporated into the design and construction phases of development. Site development and grading plans should be reviewed by GeoTek when they become available.

## 5.2 EARTHWORK CONSIDERATIONS

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Upland, the 2016 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix D outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix D.

### 5.2.1 Site Clearing and Demolition

In areas of planned grading and improvements, the site should be cleared of vegetation, roots, and debris. These materials should be properly disposed of off-site. Voids resulting from site clearing should be replaced with engineered fill materials with expansion characteristics similar to the on-site soils.

### 5.2.2 Removals

Due to the presence of undocumented fill and the disturbed nature of the exposed alluvium, we recommend that the existing soils be removed to a depth of at least four feet below existing or finish grade, whichever is deeper. In areas where fill is exposed at the base of the over-excavation, the exposed fill soils should be examined by a GeoTek representative to determine if additional removals are warranted.

A minimum of three feet of engineered fill should be provided below the bottom of the proposed footings. The horizontal extent of removals should extend at least eight feet outside the perimeter footings and floor-slabs, or a distance equal to the depth of over-excavation below the bottom of the structural elements, whichever is greater.

#### 5.2.2.1 Pavement and Hardscape Areas

A minimum of 12 inches of engineered fill should be provided below asphaltic concrete pavement and Portland cement concrete hardscape areas. The horizontal extent of removals should extend at least two feet beyond the edge.

#### 5.2.2.2 Preparation of Areas to Receive Engineered Fill

A representative of this firm should observe the bottom of all excavations. Upon approval, the exposed soils and all soils in areas to receive engineered fill should be scarified to a depth of approximately 12 inches, moistened to slightly over the optimum moisture content and compacted to a minimum relative compaction of 90 percent (ASTM D 1557).

### 5.2.3 Engineered Fills

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation, debris and other deleterious material. Due to the presence of cobbles and boulders, some sorting of over-sized materials (+6 inches) is also expected to be necessary.

The undercut areas should be brought to the final subgrade elevations with fill materials that are placed in eight inch or less loose lifts, moisture conditioned to at least the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM Test Method D 1557. The upper one foot of pavement subgrade should be compacted to 95 percent (ASTM D 1557).

### 5.2.4 Excavation Characteristics

Excavation in the on-site soils is expected to be feasible utilizing heavy-duty grading equipment in good operating condition. All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary excavations within the on-site materials should be stable at 1:1 (horizontal:vertical) inclinations for cuts less than four feet in height. Some excavation difficulties could result due to the presence of cobbles and boulders.

### 5.2.5 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage is primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of approximately 5 to 15 percent may be considered for the materials requiring removal and/or recompaction. Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction. Subsidence on the order of 0.1 to 0.2 feet may occur.

## 5.3 DESIGN RECOMMENDATIONS

### 5.3.1 Foundation Design Criteria

The soils tested within our laboratory indicated the site soils possess a "very low" ($0 \leq EI \leq 20$) expansion potential in accordance with ASTM D 4829. Foundation design criteria, in general conformance with the 2016 CBC, are presented below. Typical design criteria for the site based upon a "very low" expansion potential are tabulated below. These are minimal recommendations and are not intended to supersede the design by the project structural engineer.

The foundation elements for the proposed structures should bear entirely in engineered fill soils. Foundations should be designed in accordance with the *2016 California Building Code* (CBC).

Expansion index and soluble sulfate testing of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

A summary of our foundation design recommendations is presented in the following table:

**GEOTECHNICAL RECOMMENDATIONS FOR FOUNDATION DESIGN**

| Design Parameter | "Very Low" Expansion Potential 0≤EI≤20 |
|---|---|
| Foundation Depth or Minimum Perimeter Beam Depth (inches below the lowest adjacent grade) | One-Story – 12<br>Two-Stories – 18 |
| Minimum Foundation Width (inches)* | One- to Two-Stories – 12 |
| Minimum Slab Thickness (inches) | 4 - Actual |
| Sand Blanket and Moisture Retardant membrane below On-Grade Building Slabs | 2 inches of sand** overlying moisture vapor retardant membrane overlying 2 inches of sand** |
| Minimum Slab Reinforcing | 6" x 6" – W1.4/W1.4 welded wire fabric placed in the middle of slab |
| Minimum Footing Reinforcement for Continuous Footings, Grade Beams and Retaining Wall Footings | Two No. 4 reinforcing bars, one placed near the top and one near the bottom |
| Presaturation of Subgrade Soil (Percent of Optimum/Depth in Inches) | Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete |

* Code minimums per Table 1809.7 of the 2016 CBC
** Sand should have a sand equivalent of at least 30

An allowable bearing capacity of 2,000 pounds per square foot (psf) may be used for design of building and retaining wall footings. This value may be increased by 300 psf for each additional 12 inches of embedment depth and by 200 psf for each additional 12 inches in width to a maximum of 3,000 psf. The allowable bearing capacity may be increased by one-third when considering short-term wind and/or seismic loads.

For footings designed in accordance with the recommendations presented in this report, we would anticipate a maximum static settlement of less than one inch and a maximum differential static settlement of less than ½-inch in a 40-foot span. We recommend that the structural engineer evaluate the seismic-induced settlement and determine the impact on the proposed improvements.

The passive earth pressure may be computed as an equivalent fluid having a density of 300 psf per foot of depth, to a maximum earth pressure of 3,000 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.40 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in calculating passive pressure. When combining passive and frictional resistance, the passive pressure component should be reduced by one-third.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2013 California Green Building Standards Code (CALGreen) Section 4.505.2 and the 2013 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also

meet the requirements of ASTM E1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a six-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual possessing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, and/or architect be consulted to evaluate the general and specific moisture vapor transmission paths and associated potential impact.

In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we along with geotechnical consultants in general, do not practice in areas of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

### 5.3.2 Miscellaneous Foundation Recommendations

- To reduce moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.
- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.
- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

### 5.3.3 Foundation Set Backs

Minimum setbacks for all foundations should comply with the 2016 CBC or City of Upland requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements.

The bottom of any proposed foundations should be deepened so as to extend below a 1:1 upward projection from the bottom edge of the nearest excavation and the bottom edge of the closest footing.

### 5.3.4 Retaining and Garden Wall Design and Construction

#### 5.3.4.1 General Design Criteria

Recommendations presented in this report apply to typical masonry or concrete vertical retaining walls to a maximum height of up to six feet. Additional review and recommendations should be requested for higher walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be embedded a minimum of 12 inches into engineered fill. Retaining wall foundations should be designed in accordance with Section 5.3.1 of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of Section 5.3.4.3 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the earth retention structure, may be designed using the active condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the at-rest condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (h:v) projection from the surcharge on the stem of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

#### 5.3.4.2 Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to six feet high. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

| ACTIVE EARTH PRESSURES | |
|---|---|
| Surface Slope of Retained Materials (h:v) | Equivalent Fluid Pressure (pcf) Select Backfill* and Native Soils |
| Level | 30 |
| 2:1 | 45 |

* The design pressures assume the backfill material has an expansion index less than or equal to 20. Backfill zone includes area between back of the wall to a plane (1:1 h:v) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

### 5.3.4.3 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one-foot wide section of ¾- to one-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The upper 24 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision to the parameters provided and modification of the wall designs. The backfill materials should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D 1557. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, Miradrain 2000 or approved equivalent may be used behind the retaining wall. The Miradrain 2000 should extend from the base of the wall to within two feet of the ground surface. The subdrain should be placed in direct contact with the Miradrain 2000.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one cubic foot per linear foot of ¾- to one-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

#### 5.3.4.4 Restrained Retaining Walls

Retaining walls that will be restrained at the top that support level backfill or that have reentrant or male corners, should be designed for an equivalent at-rest fluid pressure of 55 pcf, plus any applicable surcharge loading. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

#### 5.3.4.5 Other Design Considerations

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

### 5.3.5 Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on one sample collected during the field investigation. The results of the testing indicate that the on-site soils (resistivity = 65,660 ohm-cm) are considered "progressively less corrosive" to buried ferrous metal in accordance with current standards used by corrosion engineers. We recommend that a corrosion engineer be consulted to provide recommendations for the protection of buried ferrous metal at this site.

### 5.3.6 Soil Sulfate Content

The sulfate content was determined in the laboratory for one on-site soil samples. The results indicate that the water-soluble sulfate result is less than 0.1 percent by weight, which is considered "not applicable" (negligible) as per Table 4.2.1 of ACI 318.

### 5.3.7 Import Soils

Import soils should have expansion characteristics similar to the on-site soils (EI<20). GeoTek also recommends that the proposed import soils be tested for expansion and corrosivity potential. GeoTek should be notified a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

### 5.3.8 Concrete Flatwork

#### 5.3.8.1 Exterior Concrete Slabs, Sidewalks and Driveways

Exterior concrete slabs, sidewalks and driveways should be designed using a four-inch minimum thickness. No specific reinforcement is required from a geotechnical perspective. However, some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in residential construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.

Subgrade soils (typically "very low" expansion potential) should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs, sidewalks, driveways, etc. at the subject site should be pre-saturated to a minimum of 100 percent of optimum moisture content to a depth of at least 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with City of Upland specifications, and under the observation and testing of GeoTek and a City/County inspector, if necessary.

#### 5.3.8.2 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 0.125-inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks, some cracking will occur despite the best efforts to minimize it. Concrete can also undergo chemical processes that are dependent upon a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

Exterior concrete flatwork (patios, walkways, driveways, etc.) is often some of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. We suggest that the same standards of care be applied to these features as to the structures themselves.

## 5.4 POST CONSTRUCTION CONSIDERATIONS

### 5.4.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. Care should be taken when adding soil amendments to avoid excessive watering. An abatement program to control ground-burrowing rodents should be implemented and maintained since they can decrease the long-term performance of slopes.

It is common for planting to be placed adjacent to the structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided.

### 5.4.2 Drainage

Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings. Soil areas within 10 feet of the proposed structures should slope at a minimum of five percent away from the building, if possible, unless the area is paved. Paved areas are to be sloped two percent away from the structure. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

### 5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

We recommend that specifications and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. We also recommend that GeoTek representatives be present during site grading and foundation construction to observe and document proper implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench backfill. Also, perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.
- Observe retaining wall backdrain.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. We recommend that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

## 6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our evaluation is limited to the boundaries of the subject property. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any

existing site improvements is included. The scope is based on our understanding of the project and the client's needs, our fee estimate (Proposal No. P-0602818) dated June 11, 2018 and geotechnical engineering standards normally used on similar projects in this locality at the present.

## 7. LIMITATIONS

Our findings are based on site conditions observed and the stated sources. GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Our recommendations are based on the site conditions observed and encountered and laboratory testing. Our conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

## 8. SELECTED REFERENCES

American Concrete Institute (ACI), 2006, Publication 302.2R-06, Guide for Concrete Slabs That Receive Moisture Sensitive Flooring Materials.

_____, 2010, Publications 360R-10, Guide to Design of Slabs-On-Ground.

American Society of Civil Engineers (ASCE), 2013, "Minimum Design Loads for Buildings and Other Structures," ASCE/SEI 7-10, Third Printing, Errata Incorporated through March 15.

California Code of Regulations, Title 24, 2016, "California Building Code," 3 volumes.

Carson, S. E. and Matti, J. C., 1985, "Contour Map Showing Minimum Depth to Groundwater, Upper Santa Anan River Valley, California, 1973-1979", USGS Map MF-1802.

Dibblee, T.W. and Minch, J.A., 2002, "Geologic Map of the San Dimas and Ontario Quadrangles, Los Angeles and San Bernardino Counties, California," Dibblee Geological Foundation, Dibblee Foundation Map DF-91, scale 1:24,000.

GeoTek, Inc., In-house proprietary information.

National Association of Corrosion Engineers, 1984, "Corrosion Basics, An Introduction".

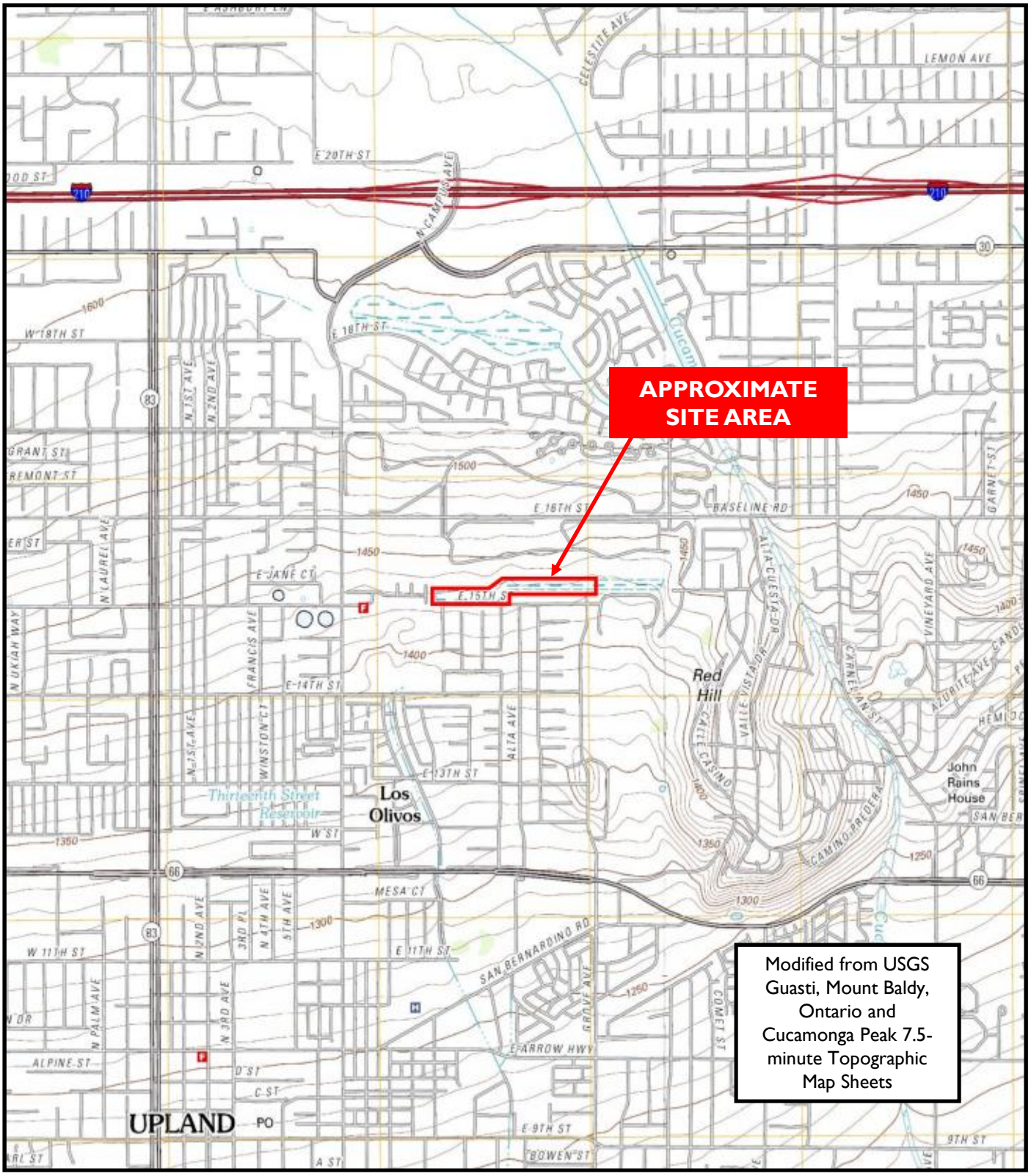
Peck, R. B., Hanson, W. E. and Thornburn, T. H., 1974, "Foundation Engineering", Second Edition.

San Bernardino County Land Use Services Geologic Hazard Maps (http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/GeologicHazardMaps.aspx)

Seismic Design Values for Buildings (http://geohazards.usgs.gov/designmaps/us/application.php).

Terzaghi, K. and Peck, R. B., 1967, "Soil Mechanics in Engineering Practice", Second Edition.

The County of San Bernardino Areawide Stormwater Program, Technical Guidance Document (TGD) for Water Quality Management Plans, Appendix VII., Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations, with an effective date of September 19, 2013.




Modified from USGS Guasti, Mount Baldy, Ontario and Cucamonga Peak 7.5-minute Topographic Map Sheets

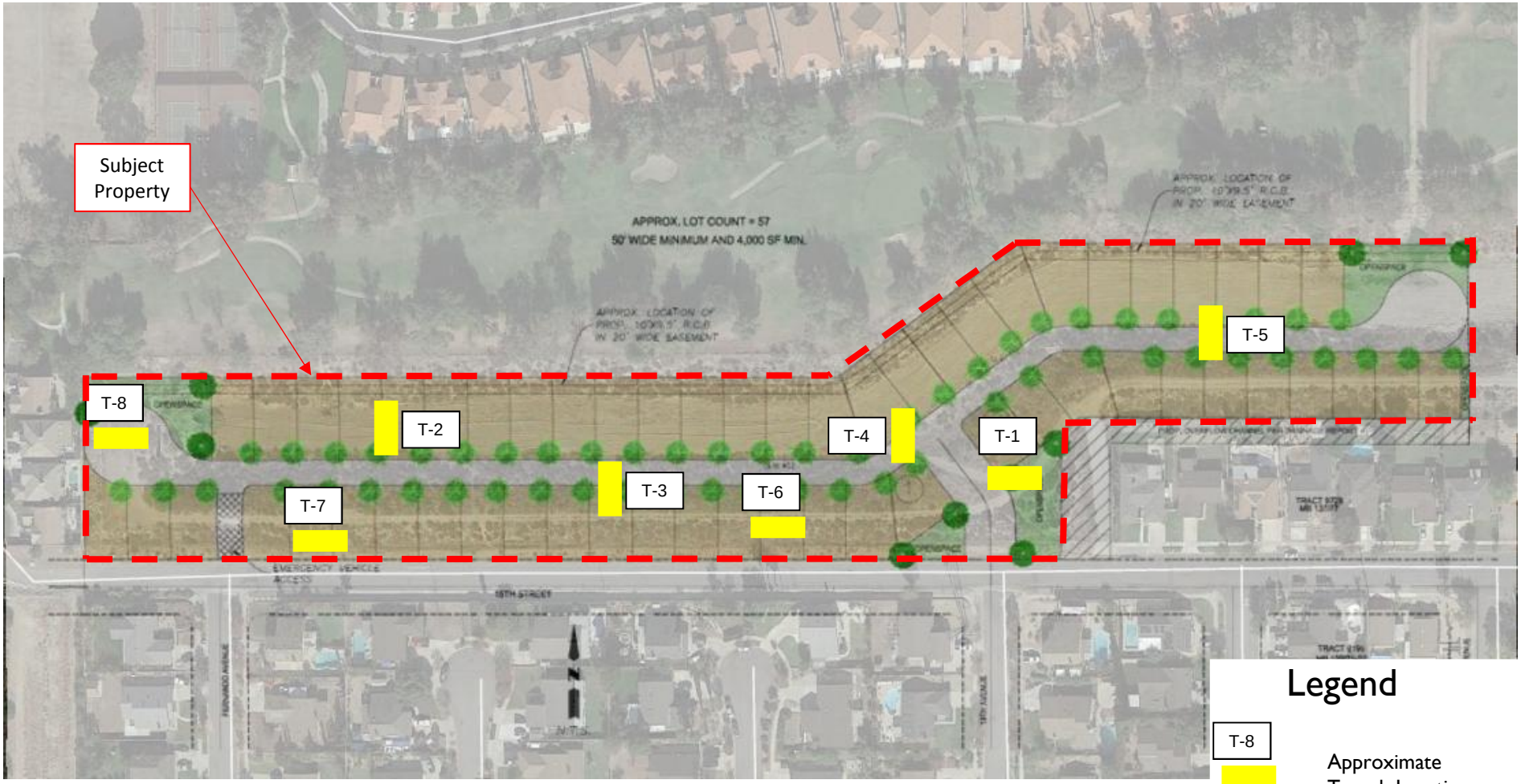
**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

Project No. 1925-CR

NORTH

**Figure 1**
**Site Location and General Site Topography Map**

GEOTEK




**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California
GeoTek Project No. 1925-CR

NORTH

Figure 2

Trench Location Map

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# APPENDIX A

## LOGS OF EXPLORATORY TRENCHES

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

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## A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

## B – TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of trenches:

*SOILS*

| | |
|---|---|
| USCS | Unified Soil Classification System |
| f-c | Fine to coarse |
| f-m | Fine to medium |

*GEOLOGIC*

| | |
|---|---|
| B: Attitudes | Bedding: strike/dip |
| J: Attitudes | Joint: strike/dip |
| C: Contact line | |
| …….. | Dashed line denotes USCS material change |
| ——— | Solid Line denotes unit / formational change |
| ——— | Thick solid line denotes end of the trench |

(Additional denotations and symbols are provided on the log of trenches)

## GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-1 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **UNDOCUMENTED ARTIFICIAL FILL** | | | |
| | | | SM | Silty gravelly f-c SAND, light brown, dry, some boulders up to 24", some roots | | | |
| | | | SP | Gravelly f-c SAND, gray, dry, some cobbles, rare boulders up to 18" | | | |
| 5 | | | | Cobble Silty f-c SAND, gray, dry | | | |
| | | | | **TRENCH TERMINATED AT 6.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-2 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | X | | SM | **ALLUVIUM**<br>Silty gravelly f-c SAND, gray, dry, some cobbles, some roots | | | EI, SR |
| | | | GP | F-c sandy GRAVEL, brownish gray, slightly moist, few cobbles<br>6" thick bed of gravel dipping same angle of slope | | | |
| | | | SP | F-c SAND, gray, dry | | | |
| 5 | | | GP | Silty f-c sandy GRAVEL, gray, slightly moist, some cobbles | | | |
| | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-3 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SM | **UNDOCUMENTED ARTIFICIAL FILL**<br>Silty f-c SAND, gray, dry, some gravel, few cobbles, some roots | | | |
| 5 | | | SP | **ALLUVIUM**<br>Gravelly f-c SAND, grayish brown, slightly moist, few cobbles, one large boulder up to 24"<br><br>Same as above, trace rootlets | | | |
| 10 | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-4 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **ALLUVIUM** | | | |
| | | | SP | Gravelly f-c SAND, brownish gray, dry, some cobbles | | | |
| | | | | Same as above, trace boulders 16-20", becomes slightly moist | | | |
| | | | SP | M-c SAND, gray, slightly moist | | | |
| 5 | | | | **TRENCH TERMINATED AT 4 FEET** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-5 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **ALLUVIUM** | | | |
| | | | SP | Gravelly f-c SAND, gray, dry, some cobble, some roots, trace boulders 12-18" | | | |
| | | | | One 24" boulder, trace oxidized staining | | | |
| | | | | Gravelly f-c SAND, grayish brown, slightly moist, trace rootlets | | | |
| 5 | | | | More cobbles become apparent | | | |
| | | | | **TRENCH TERMINATED AT 6.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-6 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **UNDOCUMENTED ARTIFICIAL FILL** | | | |
| | X | | SM | Silty f-c SAND, grayish brown, dry, some gravel, some cobble, some rootlets | | | EI |
| 5 | | | | Silty f-c SAND, grayish brown, slightly moist, some gravel, some cobble, trace boulders up to 14" | | | |
| | | | SP | Gravelly f-c SAND, grayish brown, slightly moist, some cobble, trace boulders up to 16" | | | |
| | | | | **TRENCH TERMINATED AT 7.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring; ---Large Bulk; ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-7 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SM | **UNDOCUMENTED ARTIFICIAL FILL**<br>Silty f-c SAND, brownish gray, dry, some gravel, few cobbles, some roots | | | |
| | | | SP | F-c SAND, brown, slightly moist to moist, some gravel, trace cobble, few rootlets | | | |
| 5 | | | | Same as above, no rootlets | | | |
| | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-8 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SP | **UNDOCUMENTED ARTIFICIAL FILL**<br>F-c SAND, grayish brown, dry, some gravel, trace brick and tile | | | |
| | | | SM | Silty f-c SAND, brown, slightly moist to moist, some gravel, trace cobble, rare plastic material | | | |
| | | | SP | **ALLUVIUM**<br>M-c SAND, gray, slightly moist | | | |
| 5 | | | | **TRENCH TERMINATED AT 4 FEET**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# APPENDIX B

## LABORATORY TESTING RESULTS

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

GEOTEK

# SUMMARY OF LABORATORY TESTING

## Classification

Soils were classified visually in general accordance to the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the log of trenches in Appendix A.

## Expansion Index

Expansion Index testing was performed on one representative soil sample. Testing was performed in general accordance with ASTM Test Method D 4829. The results of the testing are provided below.

| Boring No. | Depth (ft.) | Description | Expansion Index | Classification |
|---|---|---|---|---|
| T-2 | 0-2 | Silty Sand | 0 | Very Low |
| T-6 | 1-3 | Silty Sand | 0 | Very Low |

## Sulfate Content, Resistivity and Chloride Content

Testing to determine the water-soluble sulfate content was performed by Project X Corrosion Engineering in general accordance with ASTM D516. Resistivity testing was completed by others in general accordance with ASTM G187. Testing to determine the chloride content was performed by others in general accordance with ASTM D 512B. The results of the testing are provided below.

| Boring No. | Depth (ft.) | pH ASTM G51 | Chloride ASTM D512B (mg/kg)) | Sulfate ASTM D516 (% by weight) | Resistivity ASTM G187 (ohm-cm) |
|---|---|---|---|---|---|
| T-2 | 0-2 | 7.36 | 6 | 0.0030 | 65,660 |

# APPENDIX C

## INFILTRATION TEST DATA

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

GEOTEK

## PERCOLATION DATA SHEET

FRONTIER ENTERPRISES

Project: E 15TH ST. AT 13TH AVENUE, Job No.: 1925-CR.

Test Hole No.: EAST T-4 Tested By: DVG, Date: 6/28/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PREWATER 5 GAL |
| | 113 | | 12 | 12 | | | | BEGIN |
| | 116 | 3 | | | 5½ | 6½ | | 1ST 25 MIN. |
| | 118 | | 12 | 12 | | | | |
| | 122 | 4 | | | 6 | 6 | | 2ND 25 MIN. |
| | 124 | | 12 | 12 | | | | |
| | 130 | 6 | | | 4 | 8 | | 1ST 6 MIN. |
| | 132 | | 12 | 12 | | | | |
| | 138 | 6 | | | 4 | 8 | | 2ND 6 MIN. |
| | 140 | | 12 | 12 | | | | |
| | 146 | 6 | | | 4 | 8 | | 3RD 6 MIN. |
| | 148 | | 12 | 12 | | | | |
| | 154 | 6 | | | 4 | 8 | | 4TH 6 MIN. |
| | 156 | | 12 | 12 | | | | |
| | 202 | 6 | | | 4 | 8 | | 5TH 6 MIN. |
| | 204 | | 12 | 12 | | | | |
| | 210 | 6 | | | 4 | 8 | | 6TH 6 MIN. |
| | 212 | | 12 | 12 | | | | |
| | 218 | 6 | | | 4 | 8 | | 7TH 6 MIN. |

11" DIAMETER TEST HOLE

12" DEEP

60" TRENCH DEPTH

## PERCOLATION DATA SHEET

Project: _____, Job No.: _____.

Test Hole No.: T-4 Tested By: _____, Date: _____.

Depth of Hole As Drilled: _____ Before Test: _____ After Test: _____.

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | 220 | | 12 | 12 | | | | |
| | 226 | 6 | | | 4 | 8 | | 8TH 6 MIN. |
| | 228 | | 12 | 12 | | | | |
| | 234 | 6 | | | 4 1/4 | 7 3/4 | | 9TH 6 MIN. |
| | 236 | | 12 | 12 | | | | |
| | 242 | 6 | | | 4 1/4 | 7 3/4 | | 10TH 6 MIN. |
| | 244 | | 12 | 12 | | | | |
| | 250 | 6 | | | 4 1/4 | 7 3/4 | | 11TH 6 MIN. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

FRONTIER ENTERPRISES
E. 15TH ST AT 13TH AVENUE

# PERCOLATION DATA SHEET

Project: _____, Job No.: 1925-CIR.

Test Hole No.: WEST T-8 Tested By: DVG, Date: 6/29/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PREWATER 5 GAL |
| | 715 | | 12 | 12 | | | | BEGIN |
| | 740 | 25 | | | 5 1/2 | 6 1/2 | | 1ST 25 MIN. |
| | 742 | | 12 | 12 | | | | |
| | 807 | 25 | | | 5 1/2 | 6 1/2 | | 2ND 25 MIN. |
| | 809 | | 12 | 12 | | | | |
| | 839 | 30 | | | 5 | 7 | | 1ST 30 MIN. |
| | 841 | | 12 | 12 | | | | |
| | 911 | 30 | | | 5 | 7 | | 2ND 30 MIN |
| | 913 | | 12 | 12 | | | | |
| | 943 | 30 | | | 5 | 7 | | 3RD 30 MIN |
| | 945 | | 12 | 12 | | | | |
| | 1015 | 30 | | | 5 | 7 | | 4TH 30 MIN |
| | 1017 | | 12 | 12 | | | | |
| | 1047 | 30 | | | 5 | 7 | | 5TH 30 MIN |
| | 1049 | | 12 | 12 | | | | |
| | 1119 | 30 | | | 5 | 7 | | 6TH 30 MIN |
| | 1121 | | 12 | 12 | | | | |
| | 1151 | 30 | | | 5 | 7 | | 7TH 30 MIN |

11" DIAMETER TEST HOLE

12" DEEP

60" TRENCH DEPTH

## PERCOLATION DATA SHEET

Project: _____, Job No.: 1925-CR.

Test Hole No.: WEST T-8 Tested By: DVG, Date: 6/29/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | 1153 | | 12 | 12 | | | | |
| | 1223 | 30 | | | 5 | 7 | | 8TH 30 MIN. |
| | 1225 | | 12 | 12 | | | | |
| | 1255 | 30 | | | 5 | 7 | | 9TH 30 MIN. |
| | 1257 | | 12 | 12 | | | | |
| | 127 | 30 | | | 5 | 7 | | 10TH 30 MIN |
| | 129 | | 12 | 12 | | | | |
| | 159 | 30 | | | 5 | 7 | | 11TH 30 MIN |
| | 201 | | 12 | 12 | | | | |
| | 231 | 30 | | | 5 1/4 | 6 3/4 | | 12TH 30 MIN |
| | 233 | | 12 | 12 | | | | |
| | 303 | 30 | | | 5 1/4 | 6 3/4 | | 13TH 30 MIN |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | |
|---|---|
| **Client:** | **Frontier Enterprises** |
| **Project:** | **Upland** |
| **Project No:** | **1925-CR** |
| **Date:** | **6/28/2018** |

**Trench No.** **T-4**

## Percolation Rate (Porchet Method)

| | |
|---|---|
| Time Interval, $\Delta t$ = | 6 |
| Final Depth to Water, $D_F$ = | 7.75 |
| Test Hole Radius, r = | 5.5 |
| Initial Depth to Water, $D_O$ = | 0 |
| Total Test Hole Depth, $D_T$ = | 12 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 12 |
| $H_F = D_T - D_F$ = | 4.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 7.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 8.125 |

**$I_t$ =** 19.60 **Inches per Hour**

GEOTEK

| | |
|---|---|
| **Client:** | **Frontier Enterprises** |
| **Project:** | **Upland** |
| **Project No:** | **1925-CR** |
| **Date:** | **6/29/2018** |

**Trench No.** **T-8**

## Percolation Rate (Porchet Method)

| | |
|---|---|
| Time Interval, $\Delta t$ = | 30 |
| Final Depth to Water, $D_F$ = | 6.75 |
| Test Hole Radius, r = | 5.5 |
| Initial Depth to Water, $D_O$ = | 0 |
| Total Test Hole Depth, $D_T$ = | 12 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 12 |
| $H_F = D_T - D_F$ = | 5.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 6.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 8.625 |

**$I_t$ =** 3.26 **Inches per Hour**

GEOTEK

# APPENDIX D

## GENERAL EARTHWORK GRADING GUIDELINES

**APNs 1045-121-02 & 1045-151-34**

**Upland, San Bernardino County, California**

**Project No. 1925-CR**

GEOTEK

# GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

## General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2016) and the guidelines presented below.

## Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

## Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.

5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
    a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
    b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

## Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

## Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.

2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

**Fill Placement**

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
   a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
   b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
   a) They are not placed in concentrated pockets;
   b) There is a sufficient percentage of fine-grained material to surround the rocks;
   c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable

methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

### Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

## UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.

2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

## JOB SAFETY

### General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

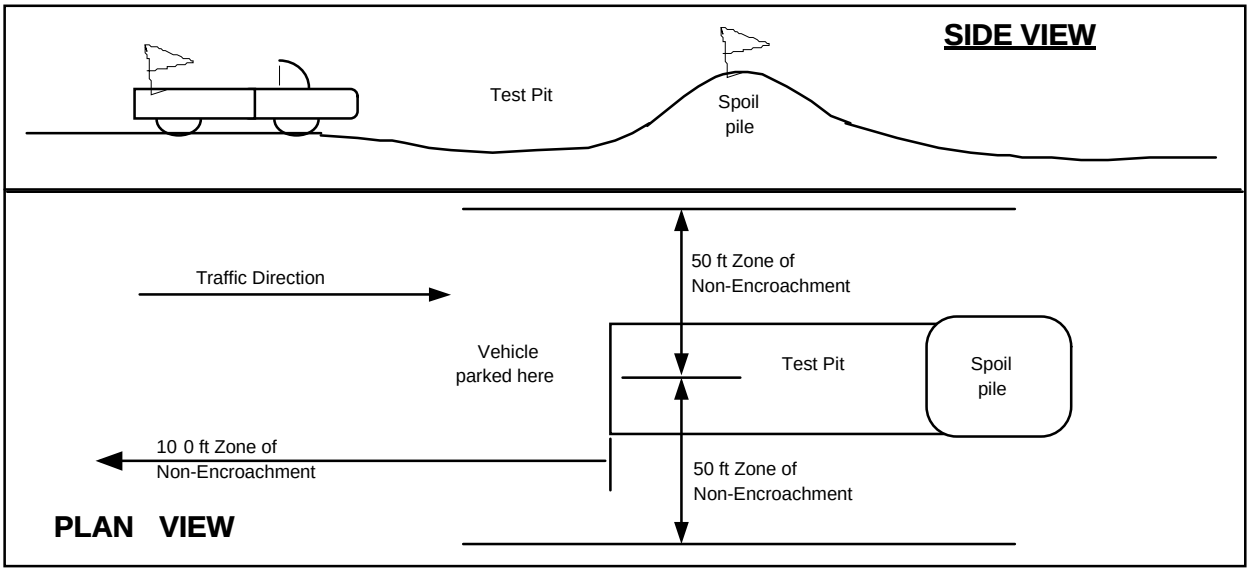
### Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

**TEST PIT SAFETY PLAN**



### Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

### Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

### Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor’s representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project

manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

# APPENDIX E:

# GREENHOUSE GAS IMPACT ANALYSIS

# Upland Colonies

## GREENHOUSE GAS ANALYSIS

### CITY OF UPLAND

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AUGUST 1, 2018

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| APS | Alternative Planning Organizations |
| ARB | California Air Resources Board |
| CAA | Federal Clean Air Act |
| CalEEMod | California Emissions Estimator Model |
| CalEPA | California Environmental Protection Agency |
| CAPCOA | California Air Pollution Control Officers Association |
| CARB | California Air Resource Board |
| CAT | Climate Action Team |
| CBSC | California Building Standards Commission |
| CEC | California Energy Commission |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| CFC | Chlorofluorocarbons |
| CFR | Code of Federal Regulations |
| CH4 | Methane |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| CPUC | California Public Utilities Commission |
| EPA | Environmental Protection Agency |
| EPS | Emission Performance Standard |
| GCC | Global Climate Change |
| GHGA | Greenhouse Gas Analysis |
| GWP | Global Warming Potential |
| HFC | Hydrofluorocarbons |
| LCA | Life-Cycle Analysis |
| MMs | Mitigation Measures |
| $MMTCO_2e$ | Million Metric Ton of Carbon Dioxide Equivalent |
| MPOs | Metropolitan Planning Organizations |
| $MTCO_2e$ | Metric Ton of Carbon Dioxide Equivalent |
| $N_20$ | Nitrogen Dioxide |
| NIOSH | National Institute for Occupational Safety and Health |
| $NO_x$ | Oxides of Nitrogen |
| PFC | Perfluorocarbons |
| $PM_{10}$ | Particulate Matter 10 microns in diameter or less |

| | |
|---|---|
| $PM_{2.5}$ | Particulate Matter 2.5 microns in diameter or less |
| PPM | Parts Per Million |
| Project | Upland Colonies |
| RTP | Regional Transportation Plan |
| SB | Senate Bill |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| SCS | Sustainable Communities Strategies |
| UNFCCC | United Nations' Framework Convention on Climate Change |
| VOC | Volatile Organic Compounds |

# EXECUTIVE SUMMARY

***GHG Impact #1: Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

The City of Upland has not adopted its own numeric threshold of significance for determining impacts with respect to greenhouse gas (GHG) emissions. A screening threshold of 3,000 $MTCO_2e$ per year to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by the County of San Bernardino (1) and numerous cities in the South Coast Air Basin and is based on the South Coast Air Quality Management District (SCAQMD) staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (2).

As shown on Table ES-1, the Project will result in approximately 1,415.62 $MTCO_2e$ per year; the proposed project would not exceed the SCAQMD/City's screening threshold of 3,000 $MTCO_2e$ per year. Thus, project-related emissions would not have a significant direct or indirect impact on GHG and climate change and no mitigation or further analysis is required.

**TABLE ES-1: TOTAL PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)**

| Emission Source | Emissions (metric tons per year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2E$ |
| Annual construction-related emissions amortized over 30 years | 25.50 | 0.01 | 0.00 | 25.63 |
| Area | 16.96 | 1.39E-03 | 2.90E-04 | 17.08 |
| Energy | 291.06 | 9.63E-03 | 3.54E-03 | 292.36 |
| Mobile Sources | 1,006.83 | 0.05 | 0.00 | 1,008.19 |
| Waste | 15.73 | 0.93 | 0.00 | 38.97 |
| Water Usage | 28.80 | 0.14 | 3.54E-03 | 33.39 |
| **Total $CO_2E$ (All Sources)** | **1,415.62** | | | |
| **SCAQMD Threshold** | **3,000** | | | |
| **Significant?** | **NO** | | | |

Source: CalEEMod™ model output, See Appendix 3.1 for detailed model outputs.
Note: Totals obtained from CalEEMod™ and may not total 100% due to rounding.
Table results include scientific notation. *e* is used to represent *times ten raised to the power of* (which would be written as x $10^{b}$") and is followed by the value of the exponent

***GHG impact #2: Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?***

Applicable plans adopted for the purpose of reducing GHG emissions include the California Air Resources Board's (CARB) Scoping Plan (2008 and 2017 Scoping Plans) and the City of Upland Climate Action Plan (CAP). Detailed evaluation with respect to the 2008 Scoping Plan, 2017 Scoping Plan, and the City of Upland CAP is presented in Sections 3.8, 3.9, and 3.10 respectively. As shown in these sections, the Project would be consistent with the 2008 Scoping Plan, the 2017 Scoping Plan, and the City of Upland CAP. As such, the Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases and a less than significant impact would occur with respect to this threshold.

## CONSTRUCTION AND OPERATIONAL-SOURCE MITIGATION MEASURES

As shown on Table ES-2, no significant impacts were identified, therefore, no mitigation measures are required.

**TABLE ES-2: SUMMARY OF CEQA SIGNIFICANCE FINDINGS**

| Analysis | Report Section | Significance Findings | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| GHG Impact #1 | 3.0 | *Less Than Significant* | *n/a* |
| GHG Impact #2 | 3.0 | *Less Than Significant* | *n/a* |

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# 1 INTRODUCTION

This report presents the results of the greenhouse gas analysis (GHGA) prepared by Urban Crossroads, Inc., for the proposed Upland Colonies Project (referred to as "Project").

The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of greenhouse gas (GHG) impacts as a result of constructing and operating the proposed Project.

## 1.1 SITE LOCATION

The proposed Upland Colonies site is located on the north side of 15th Street in the City of Upland as shown on Exhibit 1-A. The Project site is currently vacant. Land uses surrounding the Project site include a golf course to the north and residential homes to the south, west, and east. The Interstate 210 (I-210) freeway right-of-way is located roughly 1 mile north of the Project site.

## 1.2 PROJECT DESCRIPTION

Consistent with the *Upland Colonies Traffic Impact Analysis*, the Project is assumed to be developed within a single phase with an anticipated Opening Year of 2020 (3). Exhibit 1-B identifies the preliminary site plan. The Project is to include the development of 66 single family detached residential dwelling units.

## 1.3 REGULATORY REQUIREMENTS

The Project would be required to comply with all mandates imposed by the State of California and the South Coast Air Quality Management District aimed at the reduction of air quality emissions. Those that are applicable to the Project and that would assist in the reduction of greenhouse gas emissions are:

- Global Warming Solutions Act of 2006 (AB32) (4)
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (SB 375) (5)
- Pavley Fuel Efficiency Standards (AB1493). Establishes fuel efficiency ratings for new vehicles (6).
- Title 24 California Code of Regulations (California Building Code). Establishes energy efficiency requirements for new construction (7).
- Title 20 California Code of Regulations (Appliance Energy Efficiency Standards). Establishes energy efficiency requirements for appliances (8).
- Title 17 California Code of Regulations (Low Carbon Fuel Standard). Requires carbon content of fuel sold in California to be 10% less by 2020 (9).
- California Water Conservation in Landscaping Act of 2006 (AB1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (10).
- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (11).

## EXHIBIT 1-A: LOCATION MAP



**EXHIBIT 1-B: SITE PLAN**






- Renewable Portfolio Standards (SB 1078). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 percent by 2010 and 33 percent by 2020 (12).
- Senate Bill 32 (SB 32). Requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15 (13).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, the Pavley Standards, Low Carbon Fuel Standards, and Renewable Portfolio Standards (RPS) will be in effect for the AB 32 target year of 2020, and therefore are accounted for in the Project's emission calculations.

## 1.4 CONSTRUCTION AND OPERATIONAL-SOURCE MITIGATION MEASURES

No significant impacts were identified; therefore, no mitigation measures are required.

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# 2 CLIMATE CHANGE SETTING

## 2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE

Global Climate Change (GCC) is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. GCC is currently one of the most controversial environmental issues in the United States, and much debate exists within the scientific community about whether or not GCC is occurring naturally or as a result of human activity. Some data suggests that GCC has occurred in the past over the course of thousands or millions of years. These historical changes to the earth's climate have occurred naturally without human influence, as in the case of an ice age. However, many scientists believe that the climate shift taking place since the industrial revolution (1900) is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of greenhouse gases in the earth's atmosphere, including carbon dioxide, methane, nitrous oxide, and fluorinated gases. Many scientists believe that this increased rate of climate change is the result of greenhouse gases resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this GHGA cannot generate enough greenhouse gas emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of greenhouse gases combined with the cumulative increase of all other sources of greenhouse gases, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

## 2.2 GREENHOUSE GAS EMISSIONS INVENTORIES

*Global*

Worldwide anthropogenic (human) GHG emissions are tracked by the Intergovernmental Panel on Climate Change for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2016. For the Year 2016, the sum of these emissions totaled approximately 28,747,554 Gg CO2e[1] (14) (9). The GHG emissions in more recent years may differ from the inventories presented in Table 2-1; however, the data is representative of currently available inventory data.

1 The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2016 data, the UNFCCC data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," The most recent GHG emissions for China were taken in 2012, while the most recent GHG emissions for India were taken in 2010.

*United States*

As noted in Table 2-1, the United States, as a single country, was the number two producer of GHG emissions in 2016. The primary greenhouse gas emitted by human activities in the United States was $CO_2$, representing approximately 81.6 percent of total greenhouse gas emissions. Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 93.5 percent of the GHG emissions (16).

**TABLE 2-1: TOP GHG PRODUCER COUNTRIES AND THE EUROPEAN UNION** [2]

| Emitting Countries | GHG Emissions (Gg $CO_2e$) |
|---|---|
| China | 11,895,765 |
| United States | 6,511,302 |
| European Union (28 member countries) | 4,291,252 |
| India | 2,643,817 |
| Russian Federation | 2,100,850 |
| Japan | 1,304,568 |
| **Total** | **28,747,554** |

*State of California*

CARB compiles GHG inventories for the State of California. Based upon the 2018 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2016 greenhouse gas emissions inventory, California emitted 429.4 $MMTCO_2e$ including emissions resulting from imported electrical power in 2015 (17).

## 2.3 GLOBAL CLIMATE CHANGE DEFINED

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, $CO_2$ (carbon dioxide), $N_2O$ (nitrous oxide), $CH_4$ (methane), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radioactive heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

Gases that trap heat in the atmosphere are often referred to as greenhouse gases. Greenhouse gases are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse gas effect, the earth's average temperature would be approximately 61° Fahrenheit (F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

[2] Used http://unfccc.int data for Annex I countries. Consulted the CAIT Climate Data Explorer in http://www.wri.org site to reference Non-Annex I countries such as China and India.

Although California's rate of growth of greenhouse gas emissions is slowing, the state is still a substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million gross metric tons of $CO_2e$ greenhouse gas emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of greenhouse gas emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls (18).

## 2.4 GREENHOUSE GASES

For the purposes of this analysis, emissions of carbon dioxide, methane, and nitrous oxide were evaluated (see Table 3-4 later in this report) because these gasses are the primary contributors to GCC from development projects. Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

Water Vapor: Water vapor ($H_20$) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change.

As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the earth's surface and heat it up).

There are no human health effects from water vapor itself; however, when some pollutants come in contact with water vapor, they can dissolve and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide: Carbon dioxide ($CO_2$) is an odorless and colorless GHG. Outdoor levels of carbon dioxide are not high enough to result in negative health effects. Carbon dioxide is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic

matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. Carbon dioxide is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks (19).

Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, $CO_2$ concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (20).

Methane: Methane ($CH_4$) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs. No health effects are known to occur from exposure to methane.

Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide: Nitrous oxide ($N_2O$), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (21).

Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. Nitrous oxide can be transported into the stratosphere, be deposited on the earth's surface, and be converted to other compounds by chemical reaction

Chlorofluorocarbons: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane ($C_2H_6$) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 ($CHF_3$), HFC-134a ($CF_3CH_2F$), and HFC-152a ($CH_3CHF_2$). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant. The U.S. EPA estimates that concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each; and that concentrations of HFC-152a are about 1 ppt (22). No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane ($CF_4$) and hexafluoroethane ($C_2F_6$). The U.S. EPA estimates that concentrations of $CF_4$ in the atmosphere are over 70 ppt.

No health effects are known to result from exposure to PFCs. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride: Sulfur hexafluoride ($SF_6$) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest global warming potential (GWP) of any gas evaluated (23,900). The U.S. EPA indicates that concentrations in the 1990s were about 4 ppt. In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Greenhouse gases have varying GWP values; GWP values represent the potential of a gas to trap heat in the atmosphere. Carbon dioxide is utilized as the reference gas for GWP, and thus has a GWP of 1.

The atmospheric lifetime and GWP of selected greenhouse gases are summarized at Table 2-2. As shown in the table below, GWP for the Second Assessment Report (SAR), the Intergovernmental Panel on Climate Change (IPCC)'s scientific and socio-economic assessment on climate change, range from 1 for carbon dioxide to 23,900 for sulfur hexafluoride and GWP for the IPCC's 4$^{th}$ Assessment Report (AR4) range from 1 for carbon dioxide to 22,800 for sulfur hexafluoride.

**TABLE 2-2: GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIME OF SELECT GHGS**

| Gas | Atmospheric Lifetime (years) | Global Warming Potential (100 year time horizon) | |
|---|---|---|---|
| | | Second Assessment Report (SAR) | 4th Assessment Report (AR4) |
| Carbon Dioxide | 50-200 | 1 | 1 |
| Methane | 12 ± 3 | 21 | 25 |
| Nitrous Oxide | 120 | 310 | 298 |
| HFC-23 | 264 | 11,700 | 14,800 |
| HFC-134a | 14.6 | 1,300 | 1,430 |
| HFC-152a | 1.5 | 140 | 124 |
| Sulfur Hexafluoride ($SF_6$) | 3,200 | 23,900 | 22,800 |

Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

*Public Health*

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35 percent under the lower warming range (3-5.5°F) to 75 to 85 percent under the medium warming range (5.5-8°F). In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario (8-10.5°F), there could be up to 100 more days per year with temperatures above 90oF in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

*Water Resources*

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as

much as 70 to 90 percent. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

*Agriculture*

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. Although higher $CO_2$ levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate $O_3$ pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

*Forests and Landscapes*

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of

factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90 percent due to decreased precipitation.

Moreover, continued global climate change has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of global climate change.

*Rising Sea Levels*

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

## 2.5 HUMAN HEALTH EFFECTS

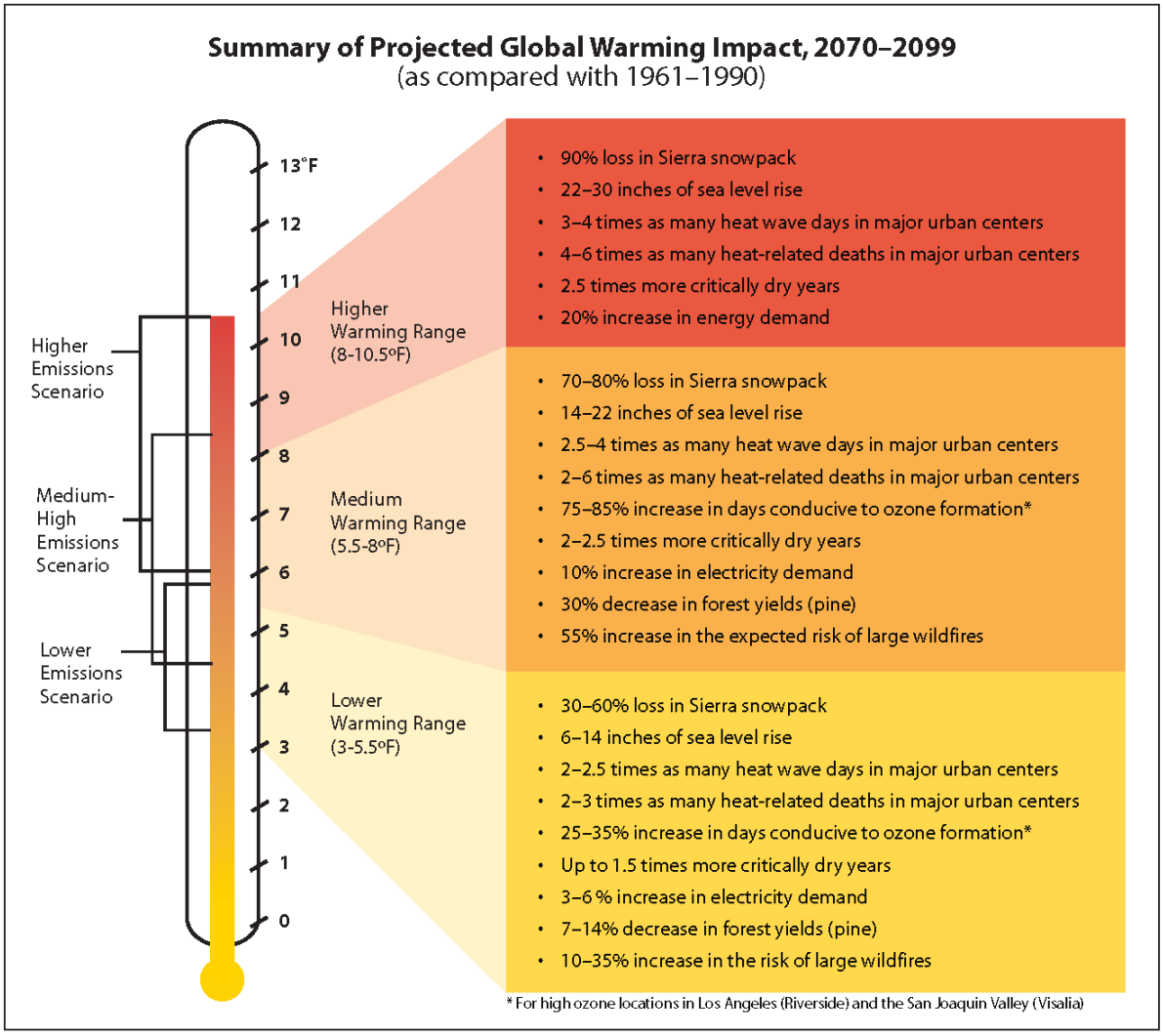
The potential health effects related directly to the emissions of carbon dioxide, methane, and nitrous oxide as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to global climate change have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (23). Exhibit 2-A presents the potential impacts of global warming.

Specific health effects associated with directly emitted GHG emissions are as follows:

Water Vapor: There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Carbon Dioxide: According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of carbon dioxide can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current

**EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT**




concentrations of carbon dioxide in the earth's atmosphere are estimated to be approximately 370 parts per million (ppm), the actual reference exposure level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (24).

Methane: Methane is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (25).

Nitrous Oxide: Nitrous Oxide is often referred to as laughing gas; it is a colorless greenhouse gas. The health effects associated with exposure to elevated concentrations of nitrous oxide include dizziness, euphoria, slight hallucinations, and in extreme cases of elevated concentrations nitrous oxide can also cause brain damage (25).

Fluorinated Gases: High concentrations of fluorinated gases can also result in adverse health effects such as asphyxiation, dizziness, headache, cardiovascular disease, cardiac disorders, and in extreme cases, increased mortality (24).

Aerosols: The health effects of aerosols are similar to that of other fine particulate matter. Thus aerosols can cause elevated respiratory and cardiovascular diseases as well as increased mortality (26).

## 2.6 REGULATORY SETTING

#### INTERNATIONAL

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

**Intergovernmental Panel on Climate Change**. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

**United Nations Framework Convention on Climate Change (Convention).** On March 21, 1994, the U.S. joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

**International Climate Change Treaties**. The Kyoto Protocol is an international agreement linked to the Convention. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at an average of five percent against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014 more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the United Nations. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties, or COP 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;
- Establish binding commitments by all parties to make "nationally determined contributions" (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and "progress made in implementing and achieving" their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will "represent a progression" beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address "loss and damage" resulting from climate change, which explicitly will not "involve or provide a basis for any liability or compensation;"
- Require parties engaging in international emissions trading to avoid "double counting;" and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC (C2ES 2015a) (27).

NATIONAL

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

**GHG Endangerment**. In *Massachusetts v. Environmental Protection Agency* 549 U.S. 497 (2007), decided on April 2, 2007, the Supreme Court found that four GHGs, including carbon dioxide, are air pollutants subject to regulation under Section 202(a)(1) of the Clean Air Act. The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below. After a lengthy legal challenge, the U.S. Supreme Court declined to review an Appeals Court ruling that upheld the EPA Administrator's findings (28).

**Clean Vehicles**. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the U.S. On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide ($CO_2$) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

CALIFORNIA

## Legislative Actions to Reduce GHGs

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark Assembly Bill (AB 32) California Global Warming Solutions Act of 2006 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

**AB 32**. The California State Legislature enacted AB 32, which requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. "GHGs" as defined under AB 32 include carbon dioxide, methane, $N_2O$, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

ARB approved the 1990 GHG emissions level of 427 $MMTCO_2e$ on December 6, 2007 (ARB 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" (BAU) scenario were estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (ARB 2008). At that level, a 28.4 percent reduction was required to achieve the 427 million $MTCO_2e$ 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million $MTCO_2e$. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010).

PROGRESS IN ACHIEVING AB 32 TARGETS AND REMAINING REDUCTIONS REQUIRED

The State has made steady progress in implementing AB 32 and achieving targets included in Executive Order S-3-05. The progress is shown in updated emission inventories prepared by ARB for 2000 through 2012 (ARB 2014a). The State has achieved the Executive Order S-3-05 target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target.

- 1990: 427 million $MTCO_2e$ (AB 32 2020 target)
- 2000: 463 million $MTCO_2e$ (an average 8 percent reduction needed to achieve 1990 base)

- 2010: 450 million $MTCO_2e$ (an average 5 percent reduction needed to achieve 1990 base)

ARB has also made substantial progress in achieving its goal of achieving 1990 emissions levels by 2020. As described earlier in this section, ARB revised the 2020 BAU inventory forecast to account for new lower growth projections, which resulted in a new lower reduction from BAU to achieve the 1990 base. The previous reduction from 2020 BAU needed to achieve 1990 levels was 28.4 percent and the latest reduction from 2020 BAU is 21.7 percent.

- 2020: 545 million $MTCO_2e$ BAU (an average 21.7 percent reduction from BAU needed to achieve 1990 base)

**ARB Scoping Plan**. ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 to comply with AB 32 (ARB 2008). The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014).

Forecasting the amount of emissions that would occur in 2020 if no actions are taken was necessary to assess the amount of reductions California must achieve to return to the 1990

emissions level by 2020 as required by AB 32. The no-action scenario is known as "business-as-usual" or BAU. The ARB originally defined the BAU scenario as emissions in the absence of any GHG emission reduction measures discussed in the Scoping Plan.

As part of CEQA compliance for the Scoping Plan, ARB prepared a Supplemental Functional Equivalent Document (FED) in 2011. The FED included an updated 2020 BAU emissions inventory projection based on current economic forecasts (i.e., as influenced by the economic downturn) and emission reduction measures already in place, replacing its prior 2020 BAU emissions inventory. ARB staff derived the updated emissions estimates by projecting emissions growth, by sector, from the state's average emissions from 2006–2008. The new BAU estimate includes emission reductions for the million-solar-roofs program, the AB 1493 (Pavley I) motor vehicle GHG emission standards, and the Low Carbon Fuels Standard. In addition, ARB factored into the 2020 BAU inventory emissions reductions associated with 33 percent Renewable Energy Portfolio Standard (RPS) for electricity generation. The updated BAU estimate of 507 $MMTCO_2e$ by 2020 requires a reduction of 80 $MMTCO_2e$, or a 16 percent reduction below the estimated BAU levels to return to 1990 levels (i.e., 427 $MMTCO_2e$) by 2020.

In order to provide a BAU reduction that is consistent with the original definition in the Scoping Plan and with threshold definitions used in thresholds adopted by lead agencies for CEQA purposes and many climate action plans, the updated inventory without regulations was also included in the Supplemental FED. The ARB 2020 BAU projection for GHG emissions in California was originally estimated to be 596 $MMTCO_2e$. The updated ARB 2020 BAU projection in the Supplemental FED is 545 $MMTCO_2e$. Considering the updated BAU estimate of 545 $MMTCO_2e$ by 2020, ARB estimates a 21.7 percent reduction below the estimated statewide BAU levels is necessary to return to 1990 emission levels (i.e., 427 $MMTCO_2e$) by 2020, instead of the approximate 28.4 percent BAU reduction previously reported under the original Climate Change Scoping Plan (2008).

2017 Climate Change Scoping Plan Update

In November 2017, ARB released the final 2017 Scoping Plan Update, which identifies the State's post-2020 reduction strategy. The 2017 Scoping Plan Update reflects the 2030 target of a 40 percent reduction below 1990 levels, set by Executive Order B-30-15 and codified by Senate Bill 32 (SB 32). Key programs that the proposed Second Update builds upon include the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, and much cleaner cars, trucks and freight movement, utilizing cleaner, renewable energy, and strategies to reduce methane emissions from agricultural and other wastes.

The 2017 Scoping Plan establishes a new emissions limit of 260 MMTCO2e for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030.

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use

planning to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030).
- Implementing SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of ZEV trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing methane and hydroflurocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030.
- Continued implementation of SB 375.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- 20 percent reduction in GHG emissions from refineries by 2030.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

In addition to the statewide strategies listed above, the 2017 Scoping Plan also identifies local governments as essential partners in achieving the State's long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 $MTCO_2e$ or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate.

According to research conducted by the Lawrence Berkeley National Laboratory and supported by ARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that GHG emissions through 2020 could range from 317 to 415 $MTCO_2e$ per year, "indicating that existing state policies will likely allow California to meet its target [of 2020 levels under AB 32]." CALGAPS also showed that by 2030, emissions could range from 211 to 428

$MTCO_2e$ per year, indicating that "even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40 percent below the 1990 level [of SB 32]." CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Though the research indicated that the emissions would not meet the State's 80 percent reduction goal by 2050, various combinations of policies could allow California's cumulative emissions to remain very low through 2050 (29) (30).

**Senate Bill 32.** On September 8, 2016, Governor Jerry Brown signed the Senate Bill (SB) 32 and its companion bill, Assembly Bill (AB) 197. SB 32 requires the state to reduce statewide GHG emissions to 40 percent below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction target of 80 percent below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that ARB is not only respond to the Governor, but also the Legislature (13) (31).

**SB 375 - the Sustainable Communities and Climate Protection Act of 2008**. Passing the Senate on August 30, 2008, Senate Bill (SB) 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts, or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the GHG emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

**AB 1493 Pavley Regulations and Fuel Efficiency Standards**. California AB 1493, enacted on July 22, 2002, required ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22 percent reduction compared with the

2002 fleet, and the mid-term (2013–2016) standards will result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

**SB 350— Clean Energy and Pollution Reduction Act of 2015.** In October 2015, the legislature approved and the Governor signed SB 350, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Provisions for a 50 percent reduction in the use of petroleum statewide were removed from the Bill because of opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030, with interim targets of 40 percent by 2024, and 25 percent by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and local publicly-owned utilities.
- Reorganize the Independent System Operator (ISO) to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States (California Leginfo 2015).

EXECUTIVE ORDERS RELATED TO GHG EMISSIONS

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

**Executive Order S-3-05**. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.

- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

**Executive Order S-01-07 – Low Carbon Fuel Standard**. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the Executive Order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

The Low Carbon Fuel Standard was challenged in the U.S. District Court in Fresno in 2011. The court's ruling issued on December 29, 2011, included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012, pending final ruling on appeal, allowing ARB to continue to implement and enforce the regulation. The Ninth Circuit Court's decision, filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that Low Carbon Fuel Standards adopted by ARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of ARB approving Low Carbon Fuel Standards (LCFS) regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, ARB was required to bring a new LCFS regulation to tits Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon intensity (low-CI) fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The second public hearing was held on September 24 and September 25, 2015, where the LCFS Regulation was adopted. The Final Rulemaking Package adopting the regulation was filed with Office of Administrative Law (OAL) on October 2, 2015. OAL had until November 16, 2015 to make a determination (ARB 2015d).

**Executive Order S-13-08**. Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the Order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the ". . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

**Executive Order B-30-15**. On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris late 2015. The Order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050 and directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of $CO_2$ equivalent ($MMCO_2e$). The Order also requires the state's climate adaptation plan to be updated every three years, and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this Order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

#### CALIFORNIA REGULATIONS AND BUILDING CODES

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

**Title 20 Appliance Efficiency Standards**. California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. 23 categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

**Title 24 Energy Efficiency Standards and California Green Building Standards**. California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel

consumption and decreases GHG emissions. The newest 2016 version of Title 24 was adopted by the California Energy Commission (CEC) and became effective on January 1, 2017.

The CEC indicates that the 2016 Title 24 standards will reduce energy consumption by 5 percent for nonresidential buildings above that achieved by the 2013 Title 24 (CEC 2015).

California Code of Regulations, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent update consisting of the 2016 California Green Building Code Standards that became effective January 1, 2017. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they establish a minimum 50 percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official. CALGreen requires:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling (5.410.1).
- Construction waste. A minimum 65 percent diversion of construction and demolition waste from landfills, increasing voluntarily to 80 percent for new homes and commercial projects (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
    - The installation of water-conserving fixtures (5.303.3) or
    - Using nonpotable water systems (5.303.4).
- Water use savings. 20 percent mandatory reduction of indoor water use with voluntary goal standards for 30, 35 and 40 percent reductions (5.303.2, A5303.2.3 [nonresidential]).
- Water meters. Separate water meters for buildings in excess of 50,000 square feet or buildings projected to consume more than 1,000 gallons per day (5.303.1).

- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas (5.304.3).
- Materials pollution control. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard (5.404).
- Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies (5.410.2)..

**Model Water Efficient Landscape Ordinance**. The Model Water Efficient Landscape Ordinance (Ordinance) was required by AB 1881, the Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Reductions in water use of 20 percent consistent with (SBX-7-7) 2020 mandate are expected upon compliance with the ordinance. Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed Department of Water Resources (DWR) to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015 effective December 15, 2015. New development projects that include landscape areas of 500 square feet or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems;
- Incentives for graywater usage;
- Improvements in on-site stormwater capture;
- Limiting the portion of landscapes that can be planted with high water use plants; and
- Reporting requirements for local agencies.

**SB 97 and the CEQA Guidelines Update**. Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On April 13, 2009, the Office of Planning and Research submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the proposed Guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February

16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process—how to determine whether the project's estimated GHG emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts, respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze GHG emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable, however it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of GHG Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable, according to Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in Appendix G was amended to include GHG questions.

REGIONAL

The project is within the Southern California Air Basin (SoCAB), which is under the jurisdiction of the SCAQMD.

**South Coast Air Quality Management District**

SCAQMD is the agency responsible for air quality planning and regulation in the SoCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SoCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim

CEQA GHG Significance Threshold, that could be applied by lead agencies. The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to the project's operational emissions. If a project's emissions are below one of the following screening thresholds, then the project is less than significant:
    - Residential and Commercial land use: 3,000 $MTCO_2e$ per year
    - Based on land use type: residential: 3,500 $MTCO_2e$ per year; commercial: 1,400 $MTCO_2e$ per year; or mixed use: 3,000 $MTCO_2e$ per year
- Tier 4 has the following options:
    - Option 1: Reduce BAU emissions by a certain percentage; this percentage is currently undefined.
    - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
    - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 $MTCO_2e$/SP/year for projects and 6.6 $MTCO_2e$/SP/year for plans;
    - Option 3, 2035 target: 3.0 $MTCO_2e$/SP/year for projects and 4.1 $MTCO_2e$/SP/year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's interim thresholds used the Executive Order S-3-05 year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, SoCal Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.

- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

## 2.7 DISCUSSION ON ESTABLISHMENT OF SIGNIFICANCE THRESHOLDS

The City of Upland released a final draft CAP in September 2015 in accordance with the California Environmental Quality Act, Section 15183.5(a), which states that lead agencies may adopt a plan for the reduction of GHG emissions that can then be used for project-specific environmental documents to tier from and/or incorporate by reference that existing programmatic review pursuant to CEQA Guidelines Sections 15183.5 (b), 15064 (h), and 15130 (32).

The CAP was designed under the premise that the City of Upland, and the community it represents, is uniquely capable of addressing emissions associated with sources under the City of Upland's jurisdiction, and that the City of Upland's emission reduction efforts should coordinate with the state strategies of reducing emissions in order to accomplish these reductions in an efficient and cost-effective manner.

According to the City of Upland's CAP, a project's 2020 GHG emissions level that amounts to at least a 16% reduction from the Project's 2008 GHG emissions levels would result in a less than significant impact with respect to GHG emissions.

### STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related greenhouse gas impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would:

- Threshold 1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The City of Upland has not adopted its own numeric threshold of significance for determining impacts with respect to greenhouse gas (GHG) emissions. A screening threshold of 3,000 $MTCO_2e$ per year to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by the County of San Bernardino (1) and numerous cities in the South Coast Air Basin and is based on the South Coast Air Quality Management District (SCAQMD) staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (2). As noted by the SCAQMD:

> "…the…screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects...the policy objective of [SCAQMD's] recommended interim GHG significance threshold proposal is to achieve an emission capture rate of 90 percent of all new or modified stationary source projects. A GHG

> significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that [SCAQMD] staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 [$MMTCO_2e$/yr]). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the statewide GHG inventory. Finally, these small sources are already subject to [Best Available Control Technology] (BACT) for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility." (2)

Thus, and based on guidance from the SCAQMD, if a non-industrial project would emit GHGs less than 3,000 $MTCO_2e$ per year, the project is not considered a substantial GHG emitter and the GHG impact is less than significant, requiring no additional analysis and no mitigation. On the other hand, if a non-industrial project would emit GHGs in excess of 3,000 $MTCO_2e$ per year, then the project could be considered a substantial GHG emitter, requiring additional analysis and potential mitigation.

As previously discussed, a screening threshold of 3,000 $MTCO_2e$ per year is an acceptable approach for small projects to determine if additional analysis is required and is therefore applied for this Project

- Threshold 2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Sections 3.8, 3.9, and 3.10 identify the Project's consistency with the 2008 Scoping Plan, 2017 Scoping Plan, and City of Upland CAP. As such, these sections are used to determine impacts with respect to Threshold 2.

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# 3 PROJECT GREENHOUSE GAS IMPACT

## 3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant greenhouse gas impact. The significance of these potential impacts is described in the following section.

## 3.2 CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ESTIMATE GHG EMISSIONS

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, $NO_x$, $SO_x$, CO, $PM_{10}$, and $PM_{2.5}$) and greenhouse gas (GHG) emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (33). Accordingly, the latest version of CalEEMod™ has been used for this Project to determine greenhouse gas emissions. Output from the model runs for both construction and operational activity are provided in Appendix 3.1. The CalEEMod model includes GHG emissions from the following source categories: construction, area, energy, mobile, waste, water.

## 3.3 CONSTRUCTION AND OPERATIONAL LIFE-CYCLE ANALYSIS NOT REQUIRED

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time (34). Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time a LCA would be extremely speculative and thus has not been prepared.

Additionally, the SDAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (35). Additionally, the science to calculate life cycle emissions is not yet established or well defined, therefore SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

## 3.4 PROJECT RELATED GREENHOUSE GAS EMISSIONS

### 3.4.1 CONSTRUCTION EMISSIONS

Construction activities associated with the Project would result in emissions of $CO_2$ and $CH_4$ from construction activities. The report *Upland Colonies Air Quality Impact Analysis Report*, Urban Crossroads, Inc. (2018) contains detailed information regarding construction activity (36).

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends

calculating the total greenhouse gas emissions for the construction activities, dividing it by a 30-year project life then adding that number to the annual operational phase GHG emissions (37). As such, construction emissions were amortized over a 30-year period and added to the annual operational phase GHG emissions.

## 3.5 OPERATIONAL EMISSIONS

Operational activities associated with the proposed Project will result in emissions of $CO_2$, $CH_4$, and $N_2O$ from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- Solid Waste
- Water Supply, Treatment and Distribution

### 3.5.1 AREA SOURCE EMISSIONS

Architectural Coatings

Over a period of time the buildings that are part of this Project will be subject to emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings as part of Project maintenance. The emissions associated with architectural coatings were calculated using the CalEEMod model.

Consumer Products

Consumer products include, but are not limited to detergents, cleaning compounds, polishes, personal care products, and lawn and garden products. Many of these products contain organic compounds which when released in the atmosphere can react to form ozone and other photochemically reactive pollutants. The emissions associated with use of consumer products were calculated based on defaults provided within the CalEEMod model.

Hearths/Fireplaces

The emissions associated with use of hearths/fireplaces were calculated based on assumptions provided in the CalEEMod model. The Project is required to comply with SCAQMD Rule 445, which prohibits the use of wood burning stoves and fireplaces in new development. In order to account for the requirements of this Rule, the unmitigated CalEEMod model estimates were adjusted to remove wood burning stoves and fireplaces. As the project is required to comply with SCAQMD Rule 445, the removal of wood burning stoves and fireplaces is not considered "mitigation" although it must be identified as such in CalEEMod in order to treat the case appropriately.

Landscape Maintenance Equipment

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers,

shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the CalEEMod model.

### 3.5.2 ENERGY SOURCE EMISSIONS

Combustion Emissions Associated with Natural Gas and Electricity

Electricity and natural gas are used by almost every project. Criteria pollutant emissions are emitted through the generation of electricity and consumption of natural gas. However, because electrical generating facilities for the Project area are located either outside the region (state) or offset through the use of pollution credits (RECLAIM) for generation within the SCAB, criteria pollutant emissions from offsite generation of electricity is generally excluded from the evaluation of significance and only natural gas use is considered. The emissions associated with natural gas use were calculated using the CalEEMod model.

### 3.6.3 MOBILE SOURCE EMISSIONS

Vehicles

Project mobile source greenhouse gas impacts are dependent on both overall daily vehicle trip generation and the effect of the Project on peak hour traffic volumes and traffic operations in the vicinity of the Project. The Project-related greenhouse gas impacts are derived primarily from vehicle trips generated by the Project. Trip characteristics available from the report, *Upland Colonies Traffic Impact Analysis* (Urban Crossroads, Inc. 2018) were utilized in this analysis (3). The proposed Project is anticipated to generate a net total of 623 trip-ends per day with 50 AM peak hour trips and 65 PM peak hour trips.

### 3.6.4 SOLID WASTE

Residential land uses will result in the generation and disposal of solid waste. A large percentage of this waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting. The remainder of the waste not diverted will be disposed of at a landfill. GHG emissions from landfills are associated with the anaerobic breakdown of material. CalEEmod default parameters were used to estimate GHG emissions associated with the disposal of solid waste for the Project scenario.

### 3.6.5 WATER SUPPLY, TREATMENT AND DISTRIBUTION

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water as well as the sources of the water. CalEEMod default parameters were used to estimate GHG emissions associated with water supply, treatment and distribution for the Project scenario.

## 3.7 EMISSIONS SUMMARY

The annual GHG emissions associated with the operation of the proposed Project are estimated to be 1,415.62 $MTCO_2e$ per year as summarized in Table 3-1. Direct and indirect operational emissions associated with the Project are compared with the SCAQMD threshold of significance for small land use projects, which is 3,000 $MTCO_2e$ per year (38). As shown, the proposed Project would result in a less than significant impact with respect to GHG emissions.

**TABLE 3-1: TOTAL PROJECT GREENHOUSE GAS EMISSIONS (ANNUAL)**

| Emission Source | Emissions (metric tons per year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2E$ |
| Annual construction-related emissions amortized over 30 years | 25.50 | 0.01 | 0.00 | 25.63 |
| Area | 16.96 | 1.39E-03 | 2.90E-04 | 17.08 |
| Energy | 291.06 | 9.63E-03 | 3.54E-03 | 292.36 |
| Mobile Sources | 1,006.83 | 0.05 | 0.00 | 1,008.19 |
| Waste | 15.73 | 0.93 | 0.00 | 38.97 |
| Water Usage | 28.80 | 0.14 | 3.54E-03 | 33.39 |
| **Total $CO_2E$ (All Sources)** | **1,415.62** | | | |
| **SCAQMD Threshold** | **3,000** | | | |
| **Significant?** | **NO** | | | |

## 3.8 2008 CARB SCOPING PLAN CONSISTENCY

AB 32 requires California to reduce its GHG emissions by approximately 28.5% when compared to GHG emissions produced under a Business as Usual scenario (39). CARB identified reduction measures to achieve this goal as set forth in the CARB Scoping Plan.

The Project would generate GHG emissions from a variety of sources which would all emit Carbon $CO_2$, $CH_4$, and $N_2O$. GHGs could also be indirectly generated by incremental electricity consumption and waste generation from the Project.

As stated previously, the CARB Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32. The CARB Scoping Plan recommendations serve as statewide measures to reduce GHG emissions levels. The Project would be consistent with the applicable measures established in the Scoping Plan, as shown in Table 3-2.

**TABLE 3-2: PROJECT CONSISTENCY WITH SCOPING PLAN GREENHOUSE GAS EMISSION REDUCTION**

| Number | Scoping Plan Measure | Remarks |
|---|---|---|
| T-1 | Pavley Motor Vehicle Standards (AB 1493) | Residents would purchase vehicles in compliance with incumbent CARB vehicle standards |
| H-4 | Limit High GWP Use in Consumer Products | Residents would use consumer products that would comply with the incumbent regulations |
| H-1 | Motor Vehicle Air Conditioning Systems – Reduction from Non-Professional Servicing | Residents would be prohibited from performing air conditioning repairs and required to use professional servicing. |
| T-4 | Tire Pressure Program | Motor vehicles driven by residents would maintain proper tire pressure when vehicles are serviced. |
| T-2 | Low Carbon Fuel Standard | Motor vehicles driven by residents would use fuels that are compliant with incumbent standards. |
| W-1 | Water Use Efficiency | Development proposals within the Project site would implement measures to minimize water use and maximize efficiency. |
| GB-1 | Green Buildings | Development proposals within the Project site would be constructed in compliance with incumbent state or local green building standards. |
| H-5 | Air Conditioning Refrigerant Leak Test During Vehicle Smog Check | Motor vehicles driven by residents, employees, and customers would comply with the leak test requirements during smog checks. |
| E-1 | Energy Efficiency Measures (Electricity) | The Project would comply with incumbent electrical energy efficiency standards |
| CR-1 | Energy Efficiency (Natural Gas) | Development proposals within the Project site would comply with incumbent natural gas energy efficiency standards |
| GB-1 | Greening New Residential and Commercial Construction | Development proposals within the Project site would comply with incumbent green building standards |
| GB-1 | Greening Existing Homes and Commercial Buildings | Development proposals within the Project site would meet retrofit standards as they become effective. |

## 3.9 SB32/2017 SCOPING PLAN CONSISTENCY

Senate Bill 32 (SB 32) requires the state to reduce statewide greenhouse gas emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide greenhouse gas reduction target of 80% below 1990 levels by 2050 (13) (31).

According to research conducted by the Lawrence Berkeley National Laboratory and supported by the CARB, California, under its existing and proposed GHG reduction policies, is on track to meet the 2020 reduction targets under AB 32 and could achieve the 2030 goals under SB 32. (29) (30).

The Project reduces its GHG emissions to the maximum extent feasible as discussed in this document. Additionally, the project applicant would not actively interfere with any future County-mandated, state-mandated, or federally-mandated retrofit obligations enacted or promulgated to legally require development County-wide, state-wide, or nation-wide to assist in meeting state-adopted greenhouse gas emissions reduction targets, including that established under Executive Order S-3-05, Executive Order B-30-15, or SB 32.

The Project does not interfere with the state's implementation of (i) Executive Order B-30-15 and SB 32's target of reducing statewide GHG emissions to 40% below 1990 levels by 2030 or (ii) Executive Order S-3-05's target of reducing statewide GHG emissions to 80% below 1990 levels by 2050 because it does not interfere with the state's implementation of GHG reduction plans described in the CARB's Updated Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, the California Building Commission mandating net zero energy homes in the building code after 2020, or existing building retrofits under AB 758. Therefore, the project's impacts on greenhouse gas emissions in the 2030 and 2050 horizon years are less than significant.

The 2017 Scoping Plan builds on the 2008 Scoping Plan in order to achieve the 40 percent reduction from 1990 levels by 2030. Major elements of the 2017 Scoping Plan framework that will achieve the GHG reductions include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks. When adopted, this measure would apply to all trucks accessing the Project site. This may include providing incentives for existing truck retrofits or new trucks purchased by the building operators to be ZEV. As such, this measure has the potential to expedite the Project's implementation of ZEVs through incentives.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030). When adopted, this measure would apply to all fuel purchased and used by the Project in the state.
- Implementing SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030. When adopted, this measure would apply when electricity is provided to the Project by a utility company.
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of ZEV trucks. When adopted, this measure would apply to all trucks accessing the Project site, this may include existing trucks or new trucks that are part of the statewide goods movement sector.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing methane and hydroflurocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030. When adopted, the Project would be required to comply with this measure and reduce SLPS accordingly.
- Continued implementation of SB 375. The Project is not within the purview of SB 375 and would therefore not conflict with this measure.
- Post-2020 Cap-and-Trade Program that includes declining caps. When adopted, the Project would be required to comply with the Cap-and-Trade Program if it generates emissions from sectors covered by Cap-and-Trade.

- 20 percent reduction in GHG emissions from refineries by 2030. When adopted, the Project would be required to comply with this measure if it were to utilize any fuel from refineries.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink. This is a statewide measure that would not apply to the Project.

As shown above, the Project would not conflict with any of the 2017 Scoping Plan elements as any regulations adopted would apply directly or indirectly to the Project.

Further, as discussed above the State's existing and proposed regulatory framework will allow the State to reduce its GHG emissions level to 40 percent below 1990 levels by 2030.

## 3.10 CITY OF UPLAND CLIMATE ACTION PLAN CONSISTENCY

The proposed project would be required to comply with CALGreen building standards, as well as implement various sustainability features with which the project applicant is required to comply. These features would foster, among other benefits, reductions in energy consumption, waste generation, and associated pollution. In addition, newer construction materials and practices, current energy efficiency requirements, and newer appliances tend to emit lower levels of air pollutant emissions, including GHGs, as compared to materials and equipment used years ago.

One of the City's methods to reduce GHG emissions is to encourage "smart growth" or promote efficient land use development (32). According to the City's CAP under Objective B: Maximize Land Use Efficiency, the project is consistent with transportation and land use Measure T-7: Residential Density. The proposed project would increase residential density on the flood control basin, which would help the City to increase residential land use density goals in the CAP. Accordingly, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions. Therefore, impacts would be less than significant, and no mitigation is required.

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# 4 REFERENCES


1. **County of San Bernardino.** *General Plan Amendment and Greenhouse Gas Reduction Plan.* San Bernardino : PMC, 2011.
2. **South Coast Air Quality Management District.** Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. [Online] http://www.aqmd.gov/hb/2008/December/081231a.htm.
3. **Urban Crossroads, Inc.** *Upland Colonies Traffic Impact Analysis.* 2018.
4. **South Coast Air Quality Management District.** RULE 1186. PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations. [Online] http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1186-1-less-polluting-sweepers.pdf?sfvrsn=4.
5. —. *Localized Significance Thresholds Methodology.* s.l. : South Coast Air Quality Managment District, 2003.
6. **Air Resources Board.** Clean Car Standards - Pavley, Assembly Bill 1493. [Online] September 24, 2009. [Cited: November 13, 2013.] http://www.arb.ca.gov/cc/ccms/ccms.htm.
7. **Building Standards Commission.** California Building Standards Code (Title 24, California Code of Regulations). [Online] [Cited: 13 2013, November.] http://www.bsc.ca.gov/codes.aspx.
8. **California Energy Commission.** California Code of Regulations, TITLE 20, Division 2. [Online] September 3, 2013. [Cited: November 13, 2013.] http://www.energy.ca.gov/reports/title20/index.html.
9. **South Coast Air Quality Management District.** RULE 1113. Architectural Coatings. [Online] http://www.aqmd.gov/rules/reg/reg11/r1113.pdf.
10. **Environmental Protection Agency.** Monitor Values Report. [Online] [Cited: September 17, 2014.] http://www.epa.gov/airdata/ad_rep_mon.html.
11. **California Energy Commission.** SB 1368 Emission Performance Standards. [Online] September 29, 2006. [Cited: November 13, 2013.] http://www.energy.ca.gov/emission_standards/.
12. **California Environmental Quality Act.** Checklist. [Online] [Cited: September 17, 2014.] http://ceres.ca.gov/ceqa/guidelines/Appendix_G.html.
13. **California Legislative Information.** Senate Bill No. 32. [Online] September 8, 2016. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32.
14. **United Nations.** GHG Profiles - Annex I. [Online] [Cited: September 20, 2017.] http://di.unfccc.int/ghg_profile_annex1.
15. —. GHG Profiles - Non-Annex I. [Online] http://di.unfccc.int/ghg_profile_non_annex1.
16. **Environmental Protection Agency.** Inventory of U.S. Greenhouse Gas Emissions and Sinks. [Online] April 12, 2013. http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf.
17. **Air Resources Board.** California Greenhouse Gas Emission Inventory -2016 Edition. [Online] June 17, 2016. http://www.arb.ca.gov/cc/inventory/data/data.htm.
18. **World Resources Institute.** Climate Analysis Indicator Tool (CAIT). [Online] http://cait.wri.org.
19. *The Carbon Cycle and Climate Change.* **Bennington, Bret J.** 1, s.l. : Brooks/Cole. ISBN 1 3: 978-0-495-73855-8.

20. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report.* **International Panel on Climate Change.** 4, 2007.
21. *Occupational Safety and Health Guideline for Nitrous Oxide.* **U.S. Department of Labor.**
22. **Environmental Protection Agency.** Overview of Greenhouse Gases. [Online] [Cited: September 17, 2014.] http://www.epa.gov/highgwp/scientific.html.
23. **American Lung Association.** Climate Change. [Online] 2013. [Cited: November 13, 2013.] http://www.lung.org/associations/states/california/advocacy/climate-change/.
24. **The National Institute for Occupational Safety and Health.** [Online] [Cited: November 13, 2013.] http://www.cdc.gov/niosh/.
25. **Occupational Health and Safety Administration.** [Online] [Cited: November 13, 2013.] https://www.osha.gov/.
26. **Hardin, Mary and Kahn, Ralph.** Aerosols & Climate Change. *Earth Observatory.* [Online] http://earthobservatory.nasa.gov/Features/Aerosols/.
27. **Center for Climate and Energy Solutions (C2ES).** Outcomes of the U.N. Climate Change Conference. *Center for Climate and Energy Solutions (C2ES).* [Online] 2015a. [Cited: April 19, 2016.] http://www.c2es.org/international/negotiations/cop21-paris/summary.
28. **Agency, United States Environmental Protection.** Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Section 202(a) of the Clean Air Act. *United States Environmental Protection Agency.* [Online] https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-section-202a-clean.
29. **Lawrence Berkeley National Laboratory.** California's Policies Can Significantly Cut Greenhouse Gas Emissions through 2030. *Lawrence Berkeley National Laboratory.* [Online] January 22, 2015. http://newscenter.lbl.gov/2015/01/22/californias-policies-can-significantly-cut-greenhouse-gas-emissions-2030/.
30. **Ernest Orlando Lawrence Berkeley National Laboratory.** Modeling California policy impacts on greenhouse gas emissions. [Online] 2015. https://eetd.lbl.gov/sites/all/files/lbnl-7008e.pdf.
31. **Policy Matters Journal: A Student Publication from the Goldman School of Public Policy.** New California Emissions Targets Spell Next Step in the State's Fight against Climate Change. [Online] September 1, 2016. http://www.policymattersjournal.org/sb32.html.
32. **City of Upland.** Climate Action Plan. *City of Upland.* [Online] September 2015. http://www.ci.upland.ca.us/uploads/ftp/city_departments/development_services/planning/pdfs/Attachment%206%20-%20Final%20Draft%20Climate%20Action%20Plan.pdf.
33. **California Air Pollution Control Officers Association (CAPCOA).** California Emissions Estimator Model (CalEEMod). [Online] September 2016. www.caleemod.com.
34. **California Natural Resources Agency.** Final Statement of Reasons for Regulatory Action, Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97. [Online] December 2009.
35. *Minutes for the GHG CEQA Significance.* **South Coast Air Quality Managment District.** 2008.
36. **Urban Crossroads, Inc.** *Upland Colonies Air Quality Impact Analysis Report.* 2018.
37. **South Coast Air Quality Management District.** *Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group #13.* [Powerpoint] Diamond Bar : s.n., 2009.

38. —. Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. [Online] http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-8/ghg-meeting-8-minutes.pdf?sfvrsn=2.

39. **Air Resources Board.** Assembly Bill 32: Global Warming Solutions Act. [Online] 2006. [Cited: November 13, 2013.] http://www.arb.ca.gov/cc/ab32/ab32.htm.

# 5 CERTIFICATION

The contents of this greenhouse gas study report represent an accurate depiction of the greenhouse gas impacts associated with the proposed Upland Colonies. The information contained in this greenhouse gas report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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### EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May, 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June, 2006

### PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

### PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June, 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April, 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August, 2007
AB2588 Regulatory Standards – Trinity Consultants • November, 2006
Air Dispersion Modeling – Lakes Environmental • June, 2006

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# APPENDIX 3.1:

# CALEEMOD EMISSIONS MODEL OUTPUTS

# Upland Colonies (Operations)

**San Bernardino-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 66.00 | Dwelling Unit | 9.16 | 158,400.00 | 189 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 10 | | | **Operational Year** | 2020 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - As per the Site Plan, the Total Lot Area is 9.16 acres.

Construction Phase - Operations Run Only.

Off-road Equipment - Operations Run Only.

Off-road Equipment - Crawler Tractors used in lieu of Tractors/Loaders/Backhoes.

Grading -

Trips and VMT - Operations Run Only.

Vehicle Trips - Trip Rates based on information provided in the TIA by Urban Crossroads (2018)

Woodstoves - Rule 445

Upland Colonies (Operations) - San Bernardino-South Coast County, Annual

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 1.00 |
| tblConstructionPhase | PhaseEndDate | 2/11/2019 | 1/1/2019 |
| tblConstructionPhase | PhaseStartDate | 1/29/2019 | 1/1/2019 |
| tblFireplaces | NumberGas | 56.10 | 66.00 |
| tblFireplaces | NumberNoFireplace | 6.60 | 0.00 |
| tblFireplaces | NumberWood | 3.30 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 2.00 |
| tblLandUse | LandUseSquareFeet | 118,800.00 | 158,400.00 |
| tblLandUse | LotAcreage | 21.43 | 9.16 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 9.54 |
| tblVehicleTrips | SU_TR | 8.62 | 8.55 |
| tblVehicleTrips | WD_TR | 9.52 | 9.44 |
| tblWoodstoves | NumberCatalytic | 3.30 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 3.30 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0600e-003 | 0.0000 | 1.0600e-003 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **1.0600e-003** | **0.0000** | **1.0600e-003** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0600e-003 | 0.0000 | 1.0600e-003 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Maximum** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **1.0600e-003** | **0.0000** | **1.0600e-003** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

Upland Colonies (Operations) - San Bernardino-South Coast County, Annual

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| | | Highest | | |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.6443 | 0.0216 | 0.6887 | 1.2000e-004 | | 4.8600e-003 | 4.8600e-003 | | 4.8600e-003 | 4.8600e-003 | 0.0000 | 16.9609 | 16.9609 | 1.3900e-003 | 2.9000e-004 | 17.0821 |
| Energy | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 291.0590 | 291.0590 | 9.6300e-003 | 3.5400e-003 | 292.3551 |
| Mobile | 0.2362 | 1.7830 | 3.0089 | 0.0109 | 0.8010 | 9.9700e-003 | 0.8110 | 0.2147 | 9.3800e-003 | 0.2241 | 0.0000 | 1,006.8289 | 1,006.8289 | 0.0544 | 0.0000 | 1,008.1893 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 15.7298 | 0.0000 | 15.7298 | 0.9296 | 0.0000 | 38.9698 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.3642 | 27.4369 | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |
| **Total** | **0.8914** | **1.8976** | **3.7372** | **0.0116** | **0.8010** | **0.0224** | **0.8234** | **0.2147** | **0.0218** | **0.2365** | **17.0940** | **1,342.2856** | **1,359.3796** | **1.1363** | **7.3700e-003** | **1,389.9847** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.6443 | 0.0216 | 0.6887 | 1.2000e-004 | | 4.8600e-003 | 4.8600e-003 | | 4.8600e-003 | 4.8600e-003 | 0.0000 | 16.9609 | 16.9609 | 1.3900e-003 | 2.9000e-004 | 17.0821 |
| Energy | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 291.0590 | 291.0590 | 9.6300e-003 | 3.5400e-003 | 292.3551 |
| Mobile | 0.2362 | 1.7830 | 3.0089 | 0.0109 | 0.8010 | 9.9700e-003 | 0.8110 | 0.2147 | 9.3800e-003 | 0.2241 | 0.0000 | 1,006.8289 | 1,006.8289 | 0.0544 | 0.0000 | 1,008.1893 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 15.7298 | 0.0000 | 15.7298 | 0.9296 | 0.0000 | 38.9698 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.3642 | 27.4369 | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |
| **Total** | **0.8914** | **1.8976** | **3.7372** | **0.0116** | **0.8010** | **0.0224** | **0.8234** | **0.2147** | **0.0218** | **0.2365** | **17.0940** | **1,342.2856** | **1,359.3796** | **1.1363** | **7.3700e-003** | **1,389.9847** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/1/2019 | 1/1/2019 | 5 | 1 | |

**Acres of Grading (Site Preparation Phase): 2**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Crawler Tractors | 0 | 8.00 | 212 | 0.43 |
| Site Preparation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Site Preparation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 0 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Site Preparation - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.0600e-003 | 0.0000 | 1.0600e-003 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **1.0600e-003** | **0.0000** | **1.0600e-003** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 3.2 Site Preparation - 2019

**Mitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.0600e-003 | 0.0000 | 1.0600e-003 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **1.0600e-003** | **0.0000** | **1.0600e-003** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.2362 | 1.7830 | 3.0089 | 0.0109 | 0.8010 | 9.9700e-003 | 0.8110 | 0.2147 | 9.3800e-003 | 0.2241 | 0.0000 | 1,006.8289 | 1,006.8289 | 0.0544 | 0.0000 | 1,008.1893 |
| Unmitigated | 0.2362 | 1.7830 | 3.0089 | 0.0109 | 0.8010 | 9.9700e-003 | 0.8110 | 0.2147 | 9.3800e-003 | 0.2241 | 0.0000 | 1,006.8289 | 1,006.8289 | 0.0544 | 0.0000 | 1,008.1893 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |
| Total | 623.04 | 629.64 | 564.30 | 2,103,569 | 2,103,569 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Single Family Housing | 14.70 | 5.90 | 8.70 | 40.20 | 19.20 | 40.60 | 86 | 11 | 3 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 0.546179 | 0.037976 | 0.179086 | 0.122965 | 0.018430 | 0.005460 | 0.017497 | 0.061396 | 0.001337 | 0.001657 | 0.006117 | 0.000817 | 0.001082 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 183.2990 | 183.2990 | 7.5700e-003 | 1.5700e-003 | 183.9547 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 183.2990 | 183.2990 | 7.5700e-003 | 1.5700e-003 | 183.9547 |
| NaturalGas Mitigated | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 107.7600 | 107.7600 | 2.0700e-003 | 1.9800e-003 | 108.4004 |
| NaturalGas Unmitigated | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 107.7600 | 107.7600 | 2.0700e-003 | 1.9800e-003 | 108.4004 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Single Family Housing | 2.01935e+006 | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 107.7600 | 107.7600 | 2.0700e-003 | 1.9800e-003 | 108.4004 |
| **Total** | | **0.0109** | **0.0931** | **0.0396** | **5.9000e-004** | | **7.5200e-003** | **7.5200e-003** | | **7.5200e-003** | **7.5200e-003** | **0.0000** | **107.7600** | **107.7600** | **2.0700e-003** | **1.9800e-003** | **108.4004** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Single Family Housing | 2.01935e+006 | 0.0109 | 0.0931 | 0.0396 | 5.9000e-004 | | 7.5200e-003 | 7.5200e-003 | | 7.5200e-003 | 7.5200e-003 | 0.0000 | 107.7600 | 107.7600 | 2.0700e-003 | 1.9800e-003 | 108.4004 |
| **Total** | | **0.0109** | **0.0931** | **0.0396** | **5.9000e-004** | | **7.5200e-003** | **7.5200e-003** | | **7.5200e-003** | **7.5200e-003** | **0.0000** | **107.7600** | **107.7600** | **2.0700e-003** | **1.9800e-003** | **108.4004** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Single Family Housing | 575288 | 183.2990 | 7.5700e-003 | 1.5700e-003 | 183.9547 |
| **Total** | | **183.2990** | **7.5700e-003** | **1.5700e-003** | **183.9547** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Single Family Housing | 575288 | 183.2990 | 7.5700e-003 | 1.5700e-003 | 183.9547 |
| **Total** | | **183.2990** | **7.5700e-003** | **1.5700e-003** | **183.9547** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.6443 | 0.0216 | 0.6887 | 1.2000e-004 | | 4.8600e-003 | 4.8600e-003 | | 4.8600e-003 | 4.8600e-003 | 0.0000 | 16.9609 | 16.9609 | 1.3900e-003 | 2.9000e-004 | 17.0821 |
| Unmitigated | 0.6443 | 0.0216 | 0.6887 | 1.2000e-004 | | 4.8600e-003 | 4.8600e-003 | | 4.8600e-003 | 4.8600e-003 | 0.0000 | 16.9609 | 16.9609 | 1.3900e-003 | 2.9000e-004 | 17.0821 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0496 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5724 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 1.6000e-003 | 0.0137 | 5.8200e-003 | 9.0000e-005 | | 1.1100e-003 | 1.1100e-003 | | 1.1100e-003 | 1.1100e-003 | 0.0000 | 15.8491 | 15.8491 | 3.0000e-004 | 2.9000e-004 | 15.9432 |
| Landscaping | 0.0208 | 7.9000e-003 | 0.6829 | 4.0000e-005 | | 3.7600e-003 | 3.7600e-003 | | 3.7600e-003 | 3.7600e-003 | 0.0000 | 1.1118 | 1.1118 | 1.0800e-003 | 0.0000 | 1.1389 |
| **Total** | **0.6443** | **0.0216** | **0.6887** | **1.3000e-004** | | **4.8700e-003** | **4.8700e-003** | | **4.8700e-003** | **4.8700e-003** | **0.0000** | **16.9609** | **16.9609** | **1.3800e-003** | **2.9000e-004** | **17.0821** |

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0496 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.5724 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 1.6000e-003 | 0.0137 | 5.8200e-003 | 9.0000e-005 | | 1.1100e-003 | 1.1100e-003 | | 1.1100e-003 | 1.1100e-003 | 0.0000 | 15.8491 | 15.8491 | 3.0000e-004 | 2.9000e-004 | 15.9432 |
| Landscaping | 0.0208 | 7.9000e-003 | 0.6829 | 4.0000e-005 | | 3.7600e-003 | 3.7600e-003 | | 3.7600e-003 | 3.7600e-003 | 0.0000 | 1.1118 | 1.1118 | 1.0800e-003 | 0.0000 | 1.1389 |
| **Total** | **0.6443** | **0.0216** | **0.6887** | **1.3000e-004** | | **4.8700e-003** | **4.8700e-003** | | **4.8700e-003** | **4.8700e-003** | **0.0000** | **16.9609** | **16.9609** | **1.3800e-003** | **2.9000e-004** | **17.0821** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |
| Unmitigated | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Single Family Housing | 4.30017 / 2.71097 | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |
| **Total** | | **28.8012** | **0.1413** | **3.5400e-003** | **33.3883** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Single Family Housing | 4.30017 / 2.71097 | 28.8012 | 0.1413 | 3.5400e-003 | 33.3883 |
| **Total** | | **28.8012** | **0.1413** | **3.5400e-003** | **33.3883** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 15.7298 | 0.9296 | 0.0000 | 38.9698 |
| Unmitigated | 15.7298 | 0.9296 | 0.0000 | 38.9698 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Single Family Housing | 77.49 | 15.7298 | 0.9296 | 0.0000 | 38.9698 |
| **Total** | | **15.7298** | **0.9296** | **0.0000** | **38.9698** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Single Family Housing | 77.49 | 15.7298 | 0.9296 | 0.0000 | 38.9698 |
| **Total** | | **15.7298** | **0.9296** | **0.0000** | **38.9698** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

### Fire Pumps and Emergency Generators

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

### Boilers

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

### User Defined Equipment

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

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# APPENDIX F:

# PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

# PHASE I ENVIRONMENTAL SITE ASSESSMENT
# ASSESSOR'S PARCEL NUMBERS (APNS) 1045-121-02 AND 1045-151-34
# UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA 91786

June 27, 2018

Project No. 1925-CR

Prepared For:

**Frontier Enterprises**
**2151 East Convention Center Way, Suite 100**
**Ontario, California 91764**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92880
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

June 27, 2018
Project No. 1925-CR

**Frontier Enterprises**
2151 East Convention Center Way, Suite 100
Ontario, California 91764

Attention: Mr. Daniel Pocius

Subject: Phase I Environmental Site Assessment
Assessor's Parcel Number (APNs) 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California 91786

Dear Mr. Pocius:

GEOTEK, INC. (GEOTEK) is pleased to present this Phase I Environmental Site Assessment for the above-referenced subject Site. Services were conducted in substantial conformance with the scope and limitations of the American Society of Testing and Materials E 1527-13, "*Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,*" which is approved to meet the requirements of the federal All Appropriate Inquiries (AAI) standards as set forth in the Code of Federal Regulations, Title 40, Section 312 (40 CFR 312), and GEOTEK'S Proposal No. P-0602718, dated June 11, 2018.

This Phase I Environmental Site Assessment has not revealed evidence of an environmental condition or concern in connection with the subject Site.

We appreciate this opportunity to be of service. If you have any questions, or if we can be of further service, please contact us at (951) 710-1160.

Sincerely,
**GEOTEK, INC.**




Edward H. LaMont
Principal Geologist, CEG 1892
Expires 07/31/2020

J. Michael Batten, CEM, REPA
Environmental Services Manager
Registered Environmental Property Assessor No. 113162
Expires 06/15/2019

Anna M. Scott
Project Geologist

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# 1.0 EXECUTIVE SUMMARY

GEOTEK, INC. (GEOTEK) has performed a Phase I Environmental Site Assessment (ESA) for the subject property: APNs 1045-121-02 and 1045-151-34 (the "Site"), located in the City of Upland, San Bernardino County, California. Our services were conducted in substantial conformance with the scope and limitations of the American Society of Testing and Materials (ASTM) E 1527-13, "*Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*", which is approved to meet the requirements of the federal All Appropriate Inquiries (AAI) standards as set forth in the Code of Federal Regulations, Title 40, Section 312 (40 CFR 312), and GEOTEK Proposal No. P-0602718, dated June 11, 2018. Any additions or deletions from our scope of services are discussed in the appropriate sections of this assessment.

A representative of GEOTEK conducted a Site reconnaissance on June 19, 2018. The weather was warm and the sky was clear. The irregular shaped Site is currently comprised of two parcels of land (identified as San Bernardino County Assessor's Parcel Numbers [APNs] 1045-121-02 and 1045-151-34) and encompasses a total of approximately 14 acres. The Site can generally be accessed from East 15th Street.

The Site is generally vacant and undeveloped land. The Site is a portion of a groundwater recharge basin. Visual evidence of hazardous substances or wastes were not observed during our Site reconnaissance. No pungent or acrid odors were observed emanating from the Site.

The Site is in an area largely characterized by residential development. The Site is bounded by a golf course, followed by residential structures, to the north; residential development to the west; East 15th Street, followed by residential development and residential development, to the south; and a basin and residential development to the east.

Based on readily available historic information, the Site appears to be vacant land from at least 1938 to at least 1966. The basin can be observed beginning in 1975. The surrounding properties appear to historically have been vacant land or generally utilized for residential development. The residences to the south of East 15th Street can be observed in 1959.

The Site appears on the database report obtained for this assessment. The Site is listed with the State Water Resources Control Board California Integrated Water Quality System (CIWQS) database as IEUA Groundwater Recharge Basin Operations and Maintenance. This listing tracks information regarding places of environmental interest, manages permits and other

orders, tracks inspections and manages violations and enforcement activities. The place/project type is listed as "dredge/fill site." No records of violations were reported for this listing. No other pertinent information is provided. Based on our historic research and status of this listing, it is our opinion that this listing does not represent a recognized environmental condition.

None of the adjacent properties appear on the database report. There are five (5) facilities listed on the database report within the various search distances specified by ASTM E 1527-13. Due to their status listings, distances, and/or locations (hydro-geologically down-or cross-gradient), it is our opinion that these facilities do not represent an environmental concern to the Site.

This Phase I Environmental Site Assessment has not revealed evidence of an environmental condition or concern in connection with the subject Site.

This executive summary does not contain all the information that is found in the full report. The report should be read in its entirety to obtain a more complete understanding of the information provided and to aid in any decisions made or actions taken based on this information.

# 2.0 INTRODUCTION

GEOTEK, INC. (GEOTEK) has performed a Phase I Environmental Site Assessment (ESA) for APNs 1045-121-02 and 1045-151-34 (the "Site"), located in the City of Upland, San Bernardino County, California.

## 2.1 PURPOSE

The purpose of this Phase I ESA was to identify and evaluate actual and potential environmental conditions involving the subject Site. It was not the purpose of this assessment to determine the degree or extent of contamination, if any, but rather the potential for contamination.

## 2.2 SCOPE OF WORK

The Phase I ESA is a general characterization of environmental concerns based on reasonably ascertainable information and observations. GEOTEK performed the Phase I ESA in substantial accordance with ASTM E 1527-13. The following services were provided for the assessment:

- A reconnaissance of the Site and surrounding properties to visually assess current utilization and indications of potential surface contamination. This was accomplished by driving the Site boundaries, and then traversing the Site until the entire Site had been surveyed.

- A reconnaissance of the surrounding area for approximately one-half mile was conducted, without entering the properties, making observations concerning property uses, conditions, and housekeeping.

- A review of the geologic and hydro-geologic settings was conducted using reasonably ascertainable public records and documents.

- An environmental database report was obtained from a data service provider. This database report compiles and locates documented "hazardous waste" facilities within specific minimum search distances as defined by ASTM E 1527-13. If necessary, additional information on identified facilities was gathered by a file review at the appropriate federal, state, local, and/or tribal regulatory agency.

- A review of reasonably ascertainable historical records (including aerial photographs, topographic maps, building records, and city directories) was conducted to assess the historical land utilization and indications of potential contamination or sources of contamination for the Site.

- This report was prepared, which relates the findings of this study and presents our conclusions and recommendations.

Specific items not included in this Scope of Services are soil analysis, water analysis, asbestos containing materials analysis, radon analysis, lead-based paint analysis, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, vapor intrusion testing, high voltage power lines, and other items not within the scope of ASTM E 1527-13.

## 2.3 SIGNIFICANT ASSUMPTIONS

Specific assumptions by GEOTEK for this assessment include:

- GEOTEK had permission to access the Site grounds;

- The client has provided GEOTEK with available geotechnical or environmental reports for the Site;

- The client has provided GEOTEK with known current or historic uses of hazardous materials at the Site, or with other specialized knowledge of the environmental history of the Site and surrounding area;

- The client is not the sole and absolute source of information;

- Seller has provided proper and complete access to their knowledge, both written and verbal, and GEOTEK can rely on the information.

## 2.4 LIMITATIONS AND EXCEPTIONS

GEOTEK conducted a Phase I Environmental Site Assessment in substantial accordance with ASTM E 1527-13 and as authorized by Frontier Enterprises. This study does not include sampling of soil, groundwater and/or the debris on-site for environmental testing. This report

is intended for the use of Frontier Enterprises. The contents should not be relied upon by any party other than the aforementioned without the express written consent of GEOTEK.

The findings, conclusions, and recommendations made in this report are based on the information that was made available to GEOTEK, in most instances from public records. The information is relevant to the date of our site work and should not be relied on to represent conditions at any later date. The opinions and conclusions expressed herein are based on information obtained during our assessment and on our experience and current standards of technical practice. GEOTEK makes no other warranties, either express or implied, concerning the completeness of the data furnished to us. GEOTEK cannot be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time our assessment was undertaken. GEOTEK is not responsible, nor liable for work, testing or recommendations performed or provided by others. This Phase I Environmental Site Assessment is not and should not be construed as a warranty or guarantee about the presence or absence of environmental hazards or contaminants, which may affect the subject site. Facts, conditions, and acceptable risk factors change with time; accordingly, this report should be viewed within this context.

Specific limitations to the scope of ASTM E 1527-13 due to contract limitations, availability of resources, and/or encountered Site conditions are discussed in the appropriate section(s) of this report.

## 2.5 SPECIAL TERMS AND CONDITIONS

This assessment report is presented as fulfilling the standard requirements of most financial institutions, governmental regulatory agencies, ASTM, and generally accepted industry standards and practices. Please refer to GEOTEK Proposal No. P-0602718 for complete terms and conditions for this assessment.

## 2.6 RELIANCE

This assessment has been prepared for the exclusive use and may be relied upon by Frontier Enterprises and their successors and assignees. Third party reliance letters may be issued upon request and upon the payment of the, then current, fee for such letters. All third parties relying on this report, by such reliance, agree to be bound by the General Conditions and Limitations agreed to Frontier Enterprises. No reliance by any party is permitted without such agreement, regardless of the content of the reliance letter itself.

# 3.0 DESCRIPTION OF SITE AND SURROUNDING AREA

The objective of describing the Site and surrounding area is to document current conditions as observed and to obtain information which would indicate the likelihood of a recognized environmental condition in connection with the Site. A representative of GEOTEK conducted a Site reconnaissance on June 19, 2018. The weather was warm and the sky was clear. The Site can generally be accessed from East 15th Street.

## 3.1 SITE LOCATION AND LEGAL DESCRIPTION

The Site is located north of East 15th Street in the City of Upland, San Bernardino County, California. According to the U.S. Geological Survey (USGS) Ontario Quadrangle topographic map sheet (7.5-minute series), the Site is located in Section 5, Township 1 South, Range 7 West, San Bernardino Baseline and Meridian (see Figure 1 in Appendix A and documents in Appendix B). The San Bernardino County Assessor's Parcel Numbers (APNs) are 1045-121-02 and 1045-151-34.

## 3.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The Site is in an area largely characterized by residential development.

## 3.3 CURRENT PROPERTY USE

The Site is generally vacant and undeveloped land. The Site is a portion of a groundwater recharge basin.

## 3.4 SITE IMPROVEMENTS

The Site is generally vacant and undeveloped land. The Site is a portion of a groundwater recharge basin. Photographs of the Site are included in Appendix C.

### 3.4.1 HAZARDOUS SUBSTANCES

Visual evidence of hazardous substances or wastes were not observed. No pungent or acrid odors were observed emanating from the Site.

### 3.4.2 STORAGE TANKS

GEOTEK did not observe evidence of underground ground storage tanks (such as vent pipes, fill pipes, regular-shaped depressions, etc.) on the Site.

### 3.4.3 POLY-CHLORINATED BIPHENYLS (PCBS)

GEOTEK did not observe suspect equipment (transformers, elevators, hydraulic lift mechanisms, trash compactors, etc.) which may contain PCBs on the Site.

### 3.4.4 CONTROLLED SUBSTANCES

GEOTEK consulted the United States Drug Enforcement Agency (DEA) website to cross-check the Site address against published facilities subject to DEA enforcement. The Site did not appear on the list of published facilities. A copy of the DEA printout is included in Appendix B.

GEOTEK did not observe evidence of illegal or controlled substances being used or manufactured at the Site.

### 3.4.5 INDICATIONS OF SOLID WASTE DISPOSAL

Waste disposal for the Site and Site area is provided by Burrtec Waste Industries.

### 3.4.6 UTILITY SUPPLY

Water and sewer services for the Site and area are provided by the City of Chino. Electric service for the Site and area is provided by Southern California Edison. Natural gas is provided for the Site and area by Southern California Gas Company.

### 3.4.7 DRAINAGE

Natural drainage at the Site is generally interpreted to be toward the south, conforming to the natural topography in the area. Ponded water was not observed during our Site reconnaissance; however, the Site is a portion of a basin.

### 3.4.8 OTHER CONDITIONS OF CONCERN

No visual indication of other conditions of concern that would indicate a recognized environmental condition was observed during the Site reconnaissance.

### 3.4.9 INTERVIEWS

GEOTEK interviewed the following individual while performing this assessment, in the form of completing a *User Questionnaire*:

- Mr. Daniel Pocius (a representative of the future Site owner) completed a User Questionnaire.

Information from this interview is incorporated into the appropriate sections of this report.

## 3.5 CURRENT ADJOINING PROPERTY USE

The Site is in an area largely characterized by residential development. The Site is bounded by a golf course, followed by residential structures, to the north; residential development to the west; East 15th Street, followed by residential development and residential development, to the south; and a basin and residential development to the east.

# 4.0 CLIENT PROVIDED INFORMATION

As a form of interview, a representative of the future Site owner completed a "User Questionnaire" for the Site in accordance with ASTM E 1527-13. A copy of the completed questionnaire is included in Appendix B.

## 4.1 ENVIRONMENTAL CLEAN UP LIENS

Mr. Daniel Pocius is not aware of any environmental clean-up liens at the Site.

## 4.2 ACTIVITY AND USE LIMITATIONS

Mr. Daniel Pocius is not aware of any activity use limitations at the Site.

## 4.3 SPECIALIZED KNOWLEDGE

Mr. Daniel Pocius is not aware of any specialized knowledge of the Site or nearby properties.

## 4.4 PURCHASE PRICE

Mr. Daniel Pocius states that the purchase price being paid for the Site reflects fair market value.

## 4.5 COMMONLY KNOWN INFORMATION

Mr. Daniel Pocius is not aware of any commonly known or reasonably ascertainable information for the Site.

## 4.6 OBVIOUS INDICATORS OF CONTAMINATION

Mr. Daniel Pocius is not aware of obvious indicators of a likely environmental impact at the Site.

## 4.7 OWNER, PROPERTY MANAGER AND OCCUPANT INFORMATION

It is our understanding that the City of Upland currently owns and manages the Site. The Site is currently vacant land; hence there are no occupants available for an interview.

## 4.8 Reason for Performing Phase I ESA

This Phase I ESA was performed at the request of Frontier Enterprises as part of their due diligence for possible future improvements on the Site and in order to qualify for one of the Landowner Liability Protections offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

## 4.9 Other User Provided Information

GeoTek was not provided with any other information for the Site by Frontier Enterprises.

# 5.0 PROPERTY PHYSICAL SETTING

Surface and subsurface environments are of interest because they control the movement of water-born contaminants, which could be transported to and from the subject Site. GEOTEK reviewed information regarding the physical setting of the subject Site and immediately surrounding area.

## 5.1 REGIONAL GEOLOGY

The property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. Basically, it extends from the point of contact with the Transverse Ranges geomorphic province, southerly to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

## 5.2 LOCAL GEOLOGIC SETTING AND TOPOGRAPHY

The Site and Site area are understood to be underlain by alluvium. Additional data regarding soil survey information for the Site and Site area is also included in Appendix B.

The Site and Site area can be considered as relatively flat terrain. Based on the USGS topographic map for the area and other documents reviewed for this report, the elevation of the subject Site is approximately 1,430 feet above mean sea level.

## 5.3 VICINITY SURFACE DRAINAGE

Natural drainage at the Site is interpreted to be dominantly directed toward the south, conforming to the natural topography in the area. Storm water runoff may drain towards the Site from the adjacent properties as the Site is a portion of a basin.

According to the Federal Emergency Management Agency (FEMA), the Site is not located within a 100- or 500-year flood zone (see Appendix D).

## 5.4 HYDROGEOLOGY

According to a review of historical groundwater data (California Department of Water Resources and California State Water Resources Control Board groundwater well data [http://wdl.water.ca.gov and http://geotracker.waterboards.ca.gov]) and in-house information, depth to groundwater is greater than 50 feet below ground surface (bgs) in the general site area, with a flow direction to the south.

# 6.0 ENVIRONMENTAL REGULATORY RECORDS REVIEW

The records review is conducted to help identify known recognized environmental conditions at the Site and/or on adjacent or nearby properties which may have impacted the subject Site.

## 6.1 ENVIRONMENTAL DATABASE RECORDS SEARCH

GEOTEK obtained and reviewed an environmental database report of the federal and state environmental records specified by ASTM E 1527-13. The database report was provided by Environmental Data Resources, Inc. (EDR) of Shelton, Connecticut. Additionally, orphan or un-mappable sites listed by EDR were reviewed for the approximate minimum search distances noted and included in our discussion, if applicable. Refer to Appendix D for a copy of the database report.

| ENVIRONMENTAL DATABASE | MINIMUM SEARCH DISTANCE | SITE | ADJACENT | TOTAL LISTED |
|---|---|---|---|---|
| U.S. Environmental Protection Agency (USEPA) - National Priorities List (NPL), including delisted NPL | 1.0 Mile | No | 0 | 0 |
| USEPA – Superfund Enterprise Management System (SEMS), including archived sites (formerly CERCLIS) | 0.5 Mile | No | 0 | 0 |
| USEPA – Resource Conservation and Recovery Act (RCRA), Corrective Action Facilities (CORRACTS) | 1.0 Mile | No | 0 | 0 |
| USEPA – RCRA, Transportation, Storage, and Disposal facilities (TSD) | 0.5 Mile | No | 0 | 0 |
| USEPA - RCRA Generators | Site and Adjacent | No | 0 | 0 |
| USEPA – Emergency Response Notification System (ERNS) | Site | No | N/A | 0 |
| Federal institutional control/engineering control registries | 0.5 Mile | No | 0 | 0 |
| California Environmental Protection Agency (CEPA) – State Response Sites (Response, formerly Annual Work Plan and Bond Expenditure Plan) | 1.0 Mile | No | 0 | 0 |

| ENVIRONMENTAL DATABASE | MINIMUM SEARCH DISTANCE | SITE | ADJACENT | TOTAL LISTED |
|---|---|---|---|---|
| CEPA – EnviroStor Database (formerly CALSITES) | 0.5 Mile | No | 0 | 0 |
| CEPA – CHMIRS - California Hazardous Materials Information Reporting System | Site | No | No | 0 |
| CEPA - Solid Waste Fill/Landfill (SWF/LF), Solid Waste Assessment Test (SWAT)/Waste Management Unit Database System (WMUDS) and Recycling Facilities (SWRCY) | 0.5 Mile | No | 0 | 2 |
| CEPA – Leaking Underground Storage Tanks (LUST) | 0.5 Mile | No | 0 | 2 |
| CEPA – Underground Storage Tanks (UST), including historic USTs | Site and Adjacent | No | 0 | 1 |
| CEPA – Spills, Leaks, Investigations & Cleanup Cost Recovery Listing (SLIC) | 0.5 Mile | No | 0 | 0 |
| State institutional control/engineering control registries | Site | No | N/A | 0 |
| Local and/or Tribal databases | Up To 1.0 Mile | No | 0 | 0 |
| Drycleaners | 0.25 Mile | No | 0 | 0 |
| Other databases | Up to 1.0 Mile | **Yes** | 0 | 1 |
| Unmappable facilities | Up to 1.0 Mile | No | 0 | 7 |

N/A – Not Applicable

## 6.2 Discussion of Regulatory Records

### 6.2.1 National Priority List

The National Priority List (NPL) is the USEPA's list of confirmed or proposed Superfund sites. Our review of this data includes sites which have been delisted from the NPL. The NPL is searched for a 1.0-mile distance.

The Site does not appear on the NPL. There are no facilities on the NPL within 1.0-mile of the Site.

### 6.2.2 SUPERFUND ENTERPRISE MANAGEMENT SYSTEM

The Superfund Enterprise Management System (SEMS, formerly CERCLIS) is a compilation of sites that the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances. Our review of SEMS sites includes archive (no further remedial action planned) facilities. The SEMS list is searched for a 0.5-mile distance.

The Site does not appear on the SEMS list. There are no facilities on the SEMS list within 0.5-mile of the Site.

### 6.2.3 RESOURCE CONSERVATION AND RECOVERY ACT

The Resource Conservation and Recovery Act compile selective information on facilities which generate, transport, store, treat and or dispose of hazardous waste. RCRA facilities can be listed on one of three databases:

- *Corrective Action Facilities (CORRACTS)* are facilities undergoing corrective action. A corrective action order is issued pursuant to RCRA Section 3008(h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. The CORRACTS list is searched for a 1.0-mile distance.

  The Site does not appear on the CORRACTS list. There are no facilities on the CORRACTS list within 1.0-mile of the Site.

- *Transportation, Storage, and Disposal Facilities (TSD)* includes facilities that transport, store or dispose of hazardous waste and are not listed on the RCRA Generators list. The TSD is searched for a 0.5-mile distance.

  The Site does not appear on the RCRA TSD list. There are no facilities on the RCRA TSD list within 0.5-mile of the Site.

- *Generators List* identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Generators database is a compilation by the EPA of

reporting facilities that generate hazardous waste. The RCRA generators list is searched for the Site and adjacent properties.

The Site does not appear on the RCRA Generators list. There are no facilities listed as a RCRA Generator within 0.25-mile of the Site.

### 6.2.4 Emergency Response Notification System

The Emergency Response Notification System (ERNS) is a national database used to collect information on reported releases of oil or hazardous substances. The ERNS list is searched for the Site. The Site does not appear on the ERNS list.

### 6.2.5 Federal Institutional Control/Engineering Control Registries

The USEPA maintains two databases which list sites that have institutional and/or engineering controls in place as part of their operations. These databases are searched for a 0.5-mile distance.

The Site does not appear on either of these databases. There are no facilities on either of these databases within 0.5-mile of the Site.

### 6.2.6 State Response Sites

The State Response Sites (RESPONSE) records are the state equivalent to the federal National Priorities List (NPL) database. The RESPONSE is searched for a 1.0-mile distance.

The Site does not appear on the on the RESPONSE. There are no RESPONSE facilities listed within a 1.0-mile distance of the Site.

### 6.2.7 EnviroStor Database

The EnviroStor Database (EnviroStor, formerly CALSITES) records are the state equivalent to the federal SEMS database. EnviroStor is searched for a 0.5-mile distance.

The Site does not appear on the EnviroStor database. There are no EnviroStor facilities within 0.5 mile of the Site.

### 6.2.8 CALIFORNIA HAZARDOUS MATERIAL INCIDENT REPORT SYSTEM

The California Hazardous Material Incident Report Systems (CHMIRS) is a state database used to collect information on reported hazardous materials incidents (accidental leaks and spills). The CHMIRS list is searched for a 0.25-mile distance.

The Site does not appear on the CHMIRS list. There are no CHMIRS facilities located within 0.25 mile of the Site.

### 6.2.9 SOLID WASTE FACILITIES LIST

The Solid Waste Fill/Landfill (SWF/LF), Waste Management Unit Database System (WMUDS)/Solid Waste Assessment Test (SWAT), and Solid Waste Recycling Facilities (SWRCY) databases includes information pertaining to closed and open solid waste facilities operating in the state of California. The SWF/LF, WMUDS/SWAT and SWRCY databases are searched for a 0.5-mile distance.

The Site does not appear on the SWF/LF, WMUDS/SWAT or SWRCY lists.

There are no facilities on the SWRCY list within 0.5-mile of the Site.

There is one (1) facility on the SWF/LF list within 0.5-mile of the Site. The facility is listed as City of Upland Disposal Site, located off Campus Avenue between 14th and 15th Street. The facility is listed as being located 0.25 to 0.5 (0.327) mile west-southwest of the Site. The facility is listed as a "solid waste disposal site." The operational status is listed as "closed." Due to the status listing, distance, and/or location (hydro-geologically cross-gradient), it is our opinion that this facility does not represent an environmental concern to the Site.

There is one (1) facility on the WMUDS/SWAT list within 0.5-mile of the Site. The facility is listed as Landfill Upland – Closed. The facility is listed as being located 0.125 to 0.25 (0.208) mile west of the Site. The facility type is listed as "solid waste site class II – landfill for non-hazardous solid wastes." Due to the status listing, distance, and/or location (hydro-geologically cross-gradient), it is our opinion that this facility does not represent an environmental concern to the Site.

### 6.2.10 LEAKING UNDERGROUND STORAGE TANKS LIST

The California Leaking Underground Storage Tanks (LUST) list is a compilation of petroleum storage tank sites that have reported a release. The LUST list is searched for a 0.5-mile distance.

The Site did not appear on the LUST list.

There are two (2) facilities listed as being on the LUST list within 0.5-mile of the Site. They are actually the same facility, Upland Hills Country Club, located at 1231 16th Street. The facility is listed as being located 0.125 to 0.25 (0.186) mile north of the Site. The facility status is listed as "preliminary site assessment underway." However, research of the facility on the California State Water Resources Control Board website (www.geoteraker.waterboards.ca.gov), the facility was issued "Case Closed" status in 1995. Based on its status and the elapsed time, it is our opinion this facility does not represent a recognized environmental condition to the Site.

### 6.2.11 UNDERGROUND STORAGE TANKS LIST

The California Underground Storage Tank (UST) list is a compilation of petroleum storage tank sites that are registered with the state of California. The UST list is searched for the Site and adjacent properties.

The Site did not appear on the UST list. There are no facilities listed on the UST list.

The Site did not appear on the HIST UST list.

There is one (1) facility listed on the HIST UST list. The facility is listed as Upland Hills Country Club, located at 1231 East 16th Street. The facility is listed as being located 0.125 to 0.25 (0.186) mile north of the Site. This facility was discussed in Section 6.2.10.

### 6.2.12 SPILLS, LEAKS, INVESTIGATION AND CLEANUP COST RECOVERY LISTING (SLIC)

The SLIC database is compiled by the CEPA California Regional Water Quality Control Board, San Ana Region. It is designed to protect and restore water quality from spills, leaks, and similar discharges. The SLIC is searched for a 0.5-mile distance.

The Site does not appear on the SLIC. There are no SLIC facilities listed within a 0.5-mile distance of the Site.

### 6.2.13 State Institutional Control/Engineering Control Registries

The State of California maintains institutional and engineering control databases or registries. This lists sites with engineering or institutional controls in place. Institutional controls include administrative measures intended to prevent exposure to contaminants remaining on site. Engineering controls include various forms of caps, building foundations, liners, and treatment methods. The State Institutional Control/Engineering Control Registries is searched for the Site.

The subject Site does not appear on the State Institutional Control/Engineering Control Registries.

### 6.2.14 Tribal Databases

Tribal governments are under the jurisdiction of the USEPA for environmental concerns. Currently, the USEPA Region 9 publishes LUST and UST information for tribes in Arizona, California, Hawaii, Nevada, and the Pacific Territories. The LUST database is searched for 0.5 mile, and the UST database is searched for 0.25 mile.

The Site does not appear on the Tribal LUST or UST databases. No facilities were identified on the Tribal LUST or UST databases within 0.5 mile of the Site.

### 6.2.15 Other Databases

The Site appears on the database report obtained for this assessment. The Site is listed with the State Water Resources Control Board California Integrated Water Quality System (CIWQS) database as IEUA Groundwater Recharge Basin Operations and Maintenance. This listing tracks information regarding places of environmental interest, manages permits and other orders, tracks inspections and manages violations and enforcement activities. The place/project type is listed as "dredge/fill site." No records of violations were reported for this listing. No other pertinent information is provided. Based on our historic research and status of this listing, it is our opinion that this listing does not represent a recognized environmental condition.

### 6.2.16 DRY CLEANERS

The DRYCLEANERS list is compiled and provided by EDR. The DRYCLEANER database is searched for a 0.25-mile distance.

The Site does not appear on the DRYCLEANER list. There are no DRYCLEANER facilities listed within 0.25-mile of the Site.

### 6.2.17 VAPOR ENCROACHMENT SCREEN

The purpose of a Vapor Encroachment Screen (VES) is to identify, to the extent feasible, if a vapor encroachment condition exists at the Site.

A Vapor Encroachment Screen Report was generated for the Site and Site area utilizing EDR's Vapor Encroachment Worksheet (see Appendix B). It was determined that there are no historical dry cleaners or auto stations within 600 feet and/or up gradient from the Site.

It was determined that a vapor encroachment condition (VEC) does not likely exist at the Site. The Vapor Encroachment Screen report is included in Appendix B.

### 6.2.18 UNMAPPABLE FACILITIES

GEOTEK reviewed the listing of "orphan" or unmappable facilities in the database report. There are seven (7) unmapped facilities in the report.

Due to the facility status listings, it is our opinion that these facilities do not represent a recognized environmental condition or concern to the Site.

## 6.3 LOCAL REGULATORY AGENCY RECORDS

GEOTEK contacted the San Bernardino County Fire and the City of Upland Police Departments regarding underground or above ground storage tanks, hazardous material permits or business plans, emergency responses, spills, inspections, or other information of an environmental or hazardous nature.

Neither of these agencies had any information for the Site.

# 7.0 SITE AND SURROUNDING AREA HISTORY

In order to construct the history of the Site and the surrounding area, GEOTEK reviewed reasonably ascertainable public documents, including aerial photographs, topographic maps, building records, city directories, fire insurance maps, and county assessor history records.

## 7.1 HISTORICAL SITE USAGE

### 7.1.1 AERIAL PHOTOGRAPH REVIEW

GEOTEK reviewed aerial photographs dated 1938, 1949, 1953, 1959, 1966, 1975, 1985, 1989, 1990, 1994, 2006, 2009, 2012, 2016 and 2017 (see Appendix B).

The Site appears to be vacant land in the 1938, 1949, 1953, 1959 and 1966 aerial photographs.

The Site appears to be part of a basin in the 1975, 1985, 1989, 1990, 1994, 2006, 2009, 2012, 2016 and 2017 aerial photographs.

A 2017 aerial photograph is utilized for Figure 2 (Appendix A).

### 7.1.2 TOPOGRAPHIC MAP REVIEW

GEOTEK reviewed the Cucamonga Quadrangle (15-minute series), dated 1897; the Cucamonga Quadrangle (15-minute series), dated 1900; the Cucamonga Quadrangle (15-minute series), dated 1903; the Ontario Quadrangle (7.5-minute series), dated 1933; the Evey Canyon Quadrangle (7.5-minute series), dated 1940; the Guasti Vicinity and Ontario and Vicinty Quadrangles (7.5-minute series), dated 1941 and 1942, respectively; the Cucamonga Quadrangle (7.5-minute series), dated 1944; the Cucamonga Peak, Guasti and Mt. Baldy Quadrangles (7.5-minute series), dated 1953, 1953 and 1954, respectively; the Ontario Quadrangle (15-minute series), dated 1954; the Cucamonga Peak, Guasti, Mt. Baldy and Ontario Quadrangles (7.5-minute series), dated 1966, 1966, 1967 and 1967 respectively; the Cucamonga Peak, Guasti, Mt. Baldy and Ontario Quadrangles (7.5-minute series), dated 1973; the Ontario Quadrangle (15-minute series), dated 1976; the Cucamonga Peak, Guasti and Ontario Quadrangles (7.5-minute series), dated 1980, 1981 and 1981, respectively; the Cucamonga Peak and Mt. Baldy Quadrangles (7.5-minute series), dated 1988; the Mount Baldy and Cucamonga Peak Quadrangles (7.5-minute series), dated 1995 and 1996 respectively; and

the Guasti, Mount Baldy, Ontario and Cucamonga Peak Quadrangles (7.5-minute series), dated 2012 (see Appendix B).

The Site appears to be vacant land on the 1897, 1900, 1903, 1933, 1941, 1942, 1944, 1953 and 1954 topographic map sheets.

The Site appears to be part of a percolation basin on the 1966, 1967, 1973, 1976, 1980 and 1981 topographic map sheets.

The Site is unmapped on the 1940, 1988, 1995 and 1996 topographic map sheets.

The 2012 maps show little detail other than streets in the vicinity. A 2012 topographic map sheet is utilized for Figure 1 (Appendix A).

### 7.1.3 Building Department Records

Building department records were not reviewed as part of this assessment as the Site has historically been and is currently vacant land.

### 7.1.4 City Directory Review

GeoTek reviewed The EDR – City Directory Abstract Report, as obtained from and provided by EDR, and included in Appendix B. A Site is address was not provided for this assessment.

### 7.1.5 Sanborn Map Review

Sanborn Fire Insurance Maps for the parcel were requested from EDR-Sanborn, which owns and maintains the largest and most complete collection of the maps. Source sheets were not available for the Site. The Sanborn Map Report is included in Appendix B.

### 7.1.6 Chain of Title

GeoTek has not received Chain-of-Title documents for the Site.

## 7.2 HISTORICAL IMMEDIATELY SURROUNDING PROPERTY USAGE

### 7.2.1 AERIAL PHOTOGRAPH REVIEW

GEOTEK reviewed aerial photographs dated 1938, 1949, 1953, 1959, 1966, 1975, 1985, 1989, 1990, 1994, 2006, 2009, 2012, 2016 and 2017 (see Appendix B).

The surrounding properties appear to be vacant land on the 1938, 1949 and 1953 aerial photographs.

The properties to the north, east and west appear to be vacant land on the 1959 and 1966 aerial photographs. Residential development can be observed to the southeast of the Site. The area to the southwest of the Site appears to be a mining area.

The basin can be observed to the west and east of the Site on the 1975 aerial photograph. The property to the north appears to be vacant land. Residential development and a mining area can be observed to the south.

Residential development can be observed to the south of the Site on the 1985 aerial photograph. The golf course can be observed to the north of the Site. The basin can be observed to the east and west.

The golf course and residences can be observed to the north of the Site on the 1989, 1990 and 1994 aerial photographs. Residential development can be observed to the south. The basin can be observed to the east. The property to the west appears to be vacant land.

The surrounding properties appear similar to current conditions in the 2006, 2009, 2012, 2016 and 2017 aerial photographs.

### 7.2.2 TOPOGRAPHIC MAP REVIEW

GEOTEK reviewed the Cucamonga Quadrangle (15-minute series), dated 1897; the Cucamonga Quadrangle (15-minute series), dated 1900; the Cucamonga Quadrangle (15-minute series), dated 1903; the Ontario Quadrangle (7.5-minute series), dated 1933; the Evey Canyon Quadrangle (7.5-minute series), dated 1940; the Guasti Vicinity and Ontario and Vicinty Quadrangles (7.5-minute series), dated 1941 and 1942, respectively; the Cucamonga Quadrangle (7.5-minute series), dated 1944; the Cucamonga Peak, Guasti and Mt. Baldy

Quadrangles (7.5-minute series), dated 1953, 1953 and 1954, respectively; the Ontario Quadrangle (15-minute series), dated 1954; the Cucamonga Peak, Guasti, Mt. Baldy and Ontario Quadrangles (7.5-minute series), dated 1966, 1966, 1967 and 1967 respectively; the Cucamonga Peak, Guasti, Mt. Baldy and Ontario Quadrangles (7.5-minute series), dated 1973; the Ontario Quadrangle (15-minute series), dated 1976; the Cucamonga Peak, Guasti and Ontario Quadrangles (7.5-minute series), dated 1980, 1981 and 1981, respectively; the Cucamonga Peak and Mt. Baldy Quadrangles (7.5-minute series), dated 1988; the Mount Baldy and Cucamonga Peak Quadrangles (7.5-minute series), dated 1995 and 1996 respectively; and the Guasti, Mount Baldy, Ontario and Cucamonga Peak Quadrangles (7.5-minute series), dated 2012 (see Appendix B).

The surrounding properties appear to be vacant land on the 1897, 1900, 1903, 1933, 1941, 1942, 1944, 1953 and 1954 topographic map sheets.

Residential development can be observed to the southeast of the Site on the 1966 and 1967 topographic map sheets.

Residential development and a mining area can be observed to the south of the Site on the 1973 and 1976 topographic map sheets.

Residential development can be observed to the south of the Site on the 1980 and 1981 topographic map sheets.

The surrounding properties are unmapped on the 1940, 1988, 1995 and 1996 topographic map sheets.

The 2012 maps show little detail other than streets in the vicinity. The 2012 map is presented as Figure 1 in Appendix A.

### 7.2.3 CITY DIRECTORIES

GEOTEK has reviewed a City Directory Abstract report obtained from and provided by EDR for the Site and surrounding property addresses. The City Directory Abstract report provides information on several nearby property addresses. The named facilities do not represent an environmental concern to the Site.

### 7.2.4 SANBORN MAP REVIEW

Sanborn Maps for the Site were requested from EDR-Sanborn, which owns and maintains the largest and most complete collection of the maps. According to EDR, source sheets were not available for the property; therefore, it is not likely that source sheets would be available for the adjoining properties. The Sanborn Map Report is included in Appendix B.

## 7.3 HISTORICAL USE SUMMARY

Based on readily available historic information, the Site appears to be vacant land from at least 1938 to at least 1966. The basin can be observed beginning in 1975. The surrounding properties appear to historically have been vacant land or generally utilized for residential development. The residences to the south of East 15th Street can be observed in 1959.

Data gaps exist from 1903 to 1933, 1959 to 1966 and 1996 to 2006 due to the limited records which are reasonably ascertainable in the local area. However, it is our opinion that additional historic information, if it were to become available, is not likely to change the conclusions or recommendations of this assessment.

## 8.0 SIGNIFICANT DATA GAPS

No significant data gaps were discovered while performing this Phase I Environmental Site Assessment. Therefore, it is our opinion that sufficient information was obtained to identify current Site conditions and past Site usage.

Minor data gaps include:

- Gaps in the historic records from 1903 to 1933, 1959 to 1966 and 1996 to 2006;
- GEOTEK has not received nor reviewed Chain-of-Title documents for the Site.

It is our opinion that additional information, if it were to become available, is not likely to change the conclusions or recommendations of this assessment.

## 9.0 CONCLUSIONS AND RECOMMENDATIONS

GEOTEK has performed a Phase I Environmental Site Assessment (ESA) for the subject Site in substantial conformance with the scope and limitations of ASTM E 1527-13 and GEOTEK Proposal No. P-0602718, dated June 11, 2018. Any exceptions to, or deletions from, this practice are described in the appropriate sections of this report.

This Phase I Environmental Site Assessment has not revealed evidence of an environmental condition or concern in connection with the subject Site.

## 10.0 CERTIFICATIONS

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject Site. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR 312.

The qualifications of the Project Team are included in Appendix F.

We appreciate this opportunity to be of service. If you have any questions, or if we can be of further service, please contact us at (951) 710-1160.

Sincerely,
**GEOTEK, INC.**




Edward H. LaMont
Principal Geologist, CEG 1892
Exp. 07/31/2020

J. Michael Batten, CEM, REPA
Environmental Services Manager
Registered Environmental Property Assessor No. 113162
Expires 06/15/2019

Anna M. Scott
Project Geologist

G:\Projects\1901 to 1950\1925CR Frontier Enterprises APNs 1045-121-02 and 1045-151-34 Upland\Phase I ESA\1925CR Phase I Environmental Site Assessment Upland.DOC

## 11.0 REFERENCES

CALIFORNIA, STATE OF

- Dibblee, T.W. and Minch, J.A., 2002, "Geologic Map of the San Dimas and Ontario Quadrangles, Los Angeles and San Bernardino Counties, California," Dibblee Geological Foundation, Dibblee Foundation Map DF-91, scale 1:24,000.
- Water Resources, Department of Hydrologic Data

ENVIRONMENTAL DATA RESOURCES, INC.

- Aerial Photo Decade Package, Inquiry No. 5331721.9, dated June 15, 2018.
- Certified Sanborn Map Report, Inquiry No. 5331724.3, dated June 14, 2018.
- City Directory Abstract Report, Inquiry No. 5331724.5, dated June 14, 2018.
- Historical Topo Map Report, Inquiry No. 5331724.4, dated June 14, 2018.
- Radius Map Report, Inquiry No. 5331724.2s, dated June 14, 2018.
- Vapor Encroachment Screen Report, Inquiry No. 5331724.2s, dated June 21, 2018.

SAN BERNARDINO, COUNTY OF

- Assessor's Office, Records Inquiry.
- Fire Department, Records Inquiry.

UPLAND, CITY OF

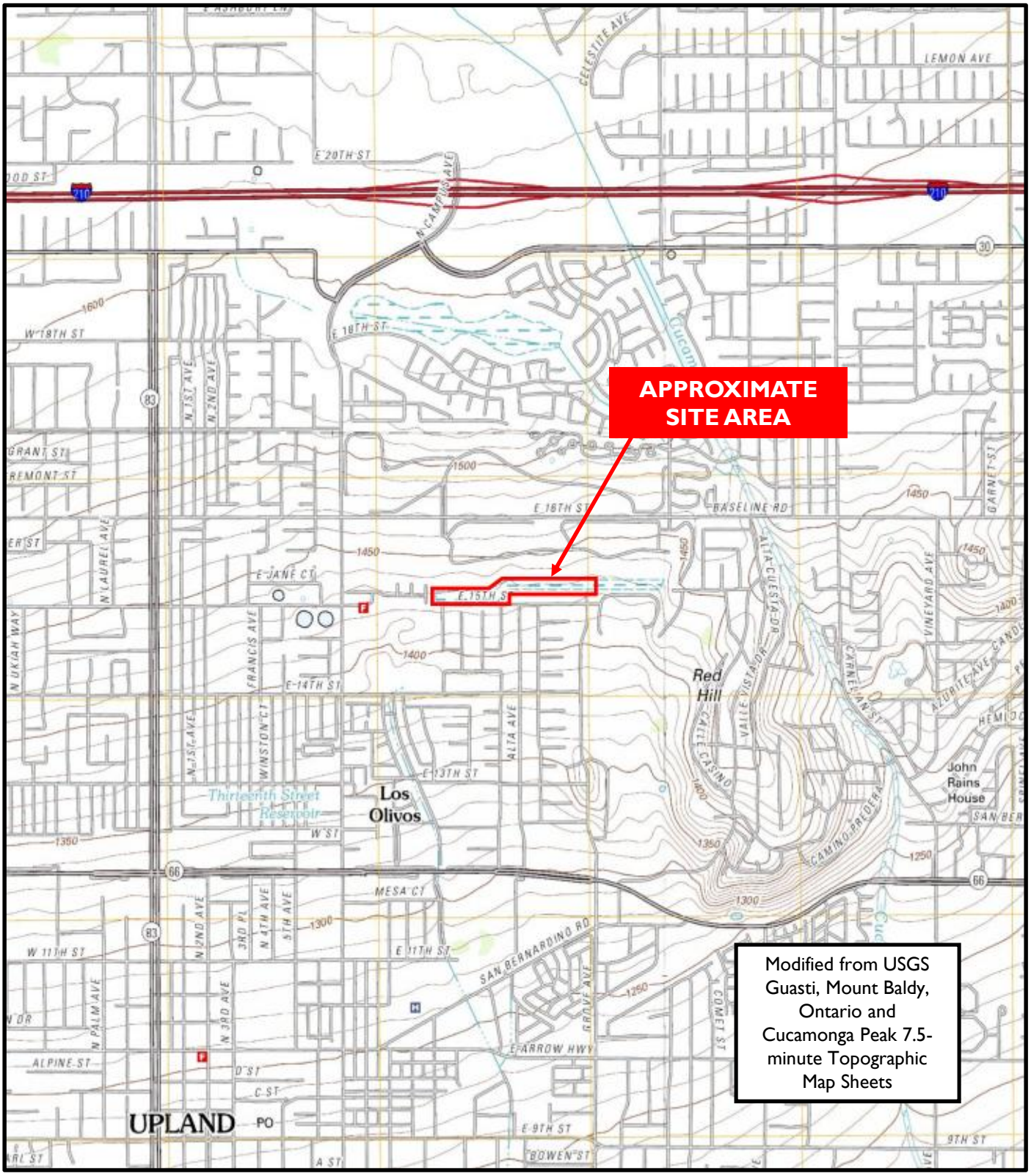
- Police Department, Records Inquiry.

U.S. GOVERNMENT

- Drug Enforcement Agency
- Records inquiry, http://www.dea.gov/seizures
- Federal Emergency Management Agency (FEMA)

# APPENDIX A

## FIGURES




**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

Project No. 1925-CR

NORTH

**Figure 1**
**Site Location and General Site Topography Map**

GEOTEK




**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

**GeoTek Project No. 1925-CR**

GEOTEK

**Figure 2**

**General Site Layout Map**

# APPENDIX B

## SUPPORTING DOCUMENTS

**Upland Site**

East 15th Street/North 13th Avenue

Upland, CA 91786

Inquiry Number: 5331724.8

June 15, 2018

# The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

# EDR Aerial Photo Decade Package

06/15/18

**Site Name:**

Upland Site
East 15th Street/North 13th Av
Upland, CA 91786
EDR Inquiry # 5331724.8

**Client Name:**

Geotek
1548 North Maple Street
Corona, CA 92880
Contact: Anna M. Scott

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

***Search Results:***

| Year | Scale | Details | Source |
|---|---|---|---|
| 2016 | 1"=500' | Flight Year: 2016 | USDA/NAIP |
| 2012 | 1"=500' | Flight Year: 2012 | USDA/NAIP |
| 2009 | 1"=500' | Flight Year: 2009 | USDA/NAIP |
| 2006 | 1"=500' | Flight Year: 2006 | USDA/NAIP |
| 1994 | 1"=500' | Acquisition Date: May 28, 1994 | USGS/DOQQ |
| 1990 | 1"=500' | Flight Date: August 29, 1990 | USDA |
| 1989 | 1"=500' | Flight Date: August 03, 1989 | USDA |
| 1985 | 1"=500' | Flight Date: September 13, 1985 | USDA |
| 1975 | 1"=500' | Flight Date: December 01, 1975 | USGS |
| 1966 | 1"=500' | Flight Date: April 21, 1966 | USGS |
| 1959 | 1"=500' | Flight Date: November 06, 1959 | USDA |
| 1953 | 1"=500' | Flight Date: March 03, 1953 | USDA |
| 1949 | 1"=500' | Flight Date: May 21, 1949 | USDA |
| 1938 | 1"=500' | Flight Date: June 03, 1938 | USDA |

**When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.**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INQUIRY #: 5331724.8

YEAR: 2016

= 500'

N

EDR


INQUIRY #: 5331724.8
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 5331724.8
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 5331724.8
YEAR: 2006
= 500'
N
EDR



INQUIRY #: 5331724.8

YEAR: 1994

= 500'

N

EDR


INQUIRY #: 5331724.8
YEAR: 1990
= 500'
N
EDR



INQUIRY #: 5331724.8

YEAR: 1989

= 500'

N

EDR



INQUIRY #: 5331724.8

YEAR: 1985

= 500'

N

EDR


INQUIRY #: 5331724.8
YEAR: 1975
= 500'
N
EDR



INQUIRY #: 5331724.8

YEAR: 1966

= 500'

N

EDR


INQUIRY #: 5331724.8
YEAR: 1959
= 500'
N
EDR


INQUIRY #: 5331724.8
YEAR: 1953
= 500'
N
EDR



INQUIRY #: 5331724.8

YEAR: 1949

= 500'

N

EDR



INQUIRY #: 5331724.8

YEAR: 1938

= 500'

N

EDR

Upland Site

East 15th Street/North 13th Avenue

Upland, CA 91786

Inquiry Number: 5331724.3

June 14, 2018

# Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

# Certified Sanborn® Map Report

06/14/18

| Site Name: | Client Name: |
|---|---|
| Upland Site | Geotek |
| East 15th Street/North 13th Ave | 1548 North Maple Street |
| Upland, CA 91786 | Corona, CA 92880 |
| EDR Inquiry # 5331724.3 | Contact: Anna M. Scott |

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Geotek were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

## *Certified Sanborn Results:*

**Certification #** DA9C-4B59-8F4D

**PO #** NA

**Project** 1925-CR

### UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: DA9C-4B59-8F4D

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

*The Sanborn Library LLC Since 1866™*

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**Upland Site**
East 15th Street/North 13th Avenue
Upland, CA 91786

Inquiry Number: 5331724.5
June 14, 2018

# The EDR-City Directory Abstract

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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**Executive Summary**

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***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.

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# EXECUTIVE SUMMARY

## DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1922 through 2014. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

## RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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## RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

| Year | Source | TP | Adjoining | Text Abstract | Source Image |
|---|---|---|---|---|---|
| 2014 | EDR Digital Archive | - | X | X | - |
| 2010 | EDR Digital Archive | - | X | X | - |
| 2008 | Haines Company, Inc. | - | X | X | - |
| 2003 | Haines & Co Publishers | - | X | X | - |
| 2002 | Cole Information Services | - | - | - | - |
| 1996 | GTE Directories | - | - | - | - |
| 1995 | GTE Directories | - | X | X | - |
| 1991 | GTE California Incorporated | - | - | - | - |
| 1990 | GTE | - | X | X | - |
| 1985 | GTE | - | X | X | - |
| 1981 | General Telephone Company of California | - | - | - | - |

# EXECUTIVE SUMMARY

| Year | Source | TP | Adjoining | Text Abstract | Source Image |
|---|---|---|---|---|---|
| 1980 | GTE General Telephone Company of California | - | X | X | - |
| 1975 | GTE Directories | - | X | X | - |
| 1970 | General Telephone Company of California | - | X | X | - |
| 1965 | Luskey Brothers & Co | - | - | - | - |
| 1964 | Luskey Brothers & Co | - | X | X | - |
| 1961 | Luskey Brothers& Co Publishers | - | - | - | - |
| 1960 | General Telephone Company Publishers | - | X | X | - |
| 1956 | General Telephone Company Publishers | - | - | - | - |
| 1955 | Luskey Brothers Co Publishers | - | - | - | - |
| 1951 | Los Angeles Directory Company Publishers | - | X | X | - |
| 1950 | The Pacific Telephone and Telegraph Co | - | - | - | - |
| 1949 | San Bernardino Directory Co. Publishers | - | - | - | - |
| 1946 | Los Angeles Directory Company Publishers | - | - | - | - |
| 1945 | Southern California Telephone Company | - | - | - | - |
| 1942 | San Bernardino Directory Co Publisher | - | - | - | - |
| 1941 | Associated Telephone Company Limited | - | - | - | - |
| 1940 | Los Angeles Directory Co. | - | - | - | - |
| 1938 | Los Angeles Directory Co. | - | - | - | - |
| 1936 | San Bernardino Directory Co Publisher | - | - | - | - |
| 1934 | Los Angeles Directory Co. | - | - | - | - |
| 1931 | Los Angeles Directory Co. | - | - | - | - |
| 1930 | San Bernardino Directory Co Publisher | - | - | - | - |
| 1926 | Los Angeles Directory Co Publisher | - | - | - | - |
| 1923 | Los Angeles Directory Company | - | - | - | - |
| 1922 | Los Angeles Directory Co Publisher | - | X | X | - |

# FINDINGS

## TARGET PROPERTY INFORMATION

### ADDRESS

East 15th Street/North 13th Avenue
Upland, CA 91786

### FINDINGS DETAIL

Target Property research detail.

# FINDINGS

## ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

### 13TH AV M

**1461 13TH AV M**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1980 | FRIEDMAN MICHAEL | GTE General Telephone Company of California |

**1475 13TH AV M**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1980 | HAMMERSCHMIDT KEN | GTE General Telephone Company of California |

**1497 13TH AV M**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1980 | SICILIA ISABEL | GTE General Telephone Company of California |
| | SICILIA ALEXANDER | GTE General Telephone Company of California |

### 13TH AVE N

**1455 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | STEINKE Kirk | Haines & Co Publishers |

**1461 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | WOLFE Jeff | Haines & Co Publishers |

**1462 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | KOZIEL Robbin | Haines & Co Publishers |

**1468 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | STUDY Kristina | Haines & Co Publishers |

# FINDINGS

**1469 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | KATNICH Mathew | Haines & Co Publishers |

**1474 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | GALVEZ Richard | Haines & Co Publishers |

**1475 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | MCGEE William | Haines & Co Publishers |

**1480 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | MERRILL Jeffrey | Haines & Co Publishers |

**1483 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | BRODY Stanley | Haines & Co Publishers |

**1487 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | GATELEY John | Haines & Co Publishers |

**1496 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | BETANCOURT Jesus | Haines & Co Publishers |

**1497 13TH AVE N**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 2003 | SICILIA Alexander | Haines & Co Publishers |

## 15TH ST

**1208 15TH ST**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1922 | Vacant | Los Angeles Directory Co Publisher |

# FINDINGS

## 15TH ST E

**1335 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | HUDSON Joe | Haines & Co Publishers |

**1345 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | GIUS John | Haines & Co Publishers |

**1353 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | CISNEROS Noberto | Haines & Co Publishers |

**1361 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | D I TECHNOLOGIES | Haines & Co Publishers |

**1367 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | HILL Michael | Haines & Co Publishers |
| | HILL Jenny | Haines & Co Publishers |

**1377 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | FERREE Philip | Haines & Co Publishers |

**1378 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | DORANTES Ricardo | Haines & Co Publishers |

**1385 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | STANLEY Ronny | Haines & Co Publishers |

**1393 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | CRAIG Veronica | Haines & Co Publishers |

**1405 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | GUNN Scott | Haines & Co Publishers |

# FINDINGS

**1406 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | HANCOCK Susan | Haines & Co Publishers |

**1411 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | JOHNSON Michael | Haines & Co Publishers |

**1412 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | VIOLET A | Haines & Co Publishers |

**1421 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | NGUYEN Ha | Haines & Co Publishers |

**1422 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | SHARP Wayne | Haines & Co Publishers |

**1429 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | LEE Nam O | Haines & Co Publishers |

**1432 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | UNDERDAHL Richard | Haines & Co Publishers |

**1437 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | AUZENNE Ronald | Haines & Co Publishers |

**1442 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | AMOUDEH Hedayat | Haines & Co Publishers |

**1443 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | AFOEJU Ifeoma | Haines & Co Publishers |

**1447 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | RES CARE INC | Haines & Co Publishers |

# FINDINGS

| Year | Uses | Source |
|---|---|---|
| 2003 | RES CARE INC | Haines & Co Publishers |

**1448 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | KANENBLEY Norman | Haines & Co Publishers |
| | GARCIA Sergio | Haines & Co Publishers |
| 1970 | TRAMONTANA JOSEPH C | General Telephone Company of California |

**1457 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | WATSON Diane | Haines & Co Publishers |
| | HERNANDEZ Peter | Haines & Co Publishers |
| | WATSON Bryan | Haines & Co Publishers |

**1458 15TH ST E**

| Year | Uses | Source |
|---|---|---|
| 2003 | LEAHY James | Haines & Co Publishers |

## ALTA AVE

**1474 ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | BOISVERT Marc | Haines Company, Inc. |

**1480 ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | WANSTRATH David | Haines Company, Inc. |

## Alta Ave

**1486 Alta Ave**

| Year | Uses | Source |
|---|---|---|
| 2010 | CITYWIDE PLUMBING HEATING AIR | EDR Digital Archive |

## ALTA AVE

**1486 ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |

# FINDINGS

**1490 ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | NORDEN Glenn A | Haines Company, Inc. |

## Alta Ave

**1498 Alta Ave**

| Year | Uses | Source |
|---|---|---|
| 2014 | FEUDATORY INTL TRDG CO LTD | EDR Digital Archive |
| | LAPROLLER TRADING INC | EDR Digital Archive |
| 2010 | FEUDATORY INTL TRDG CO LTD | EDR Digital Archive |
| | LAPROLLER TRADING INC | EDR Digital Archive |

## ALTA AVE

**1498 ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | FENG Chao | Haines Company, Inc. |

## ALTA AVE N

**1474 ALTA AVE N**

| Year | Uses | Source |
|---|---|---|
| 2003 | CARLOS Don | Haines & Co Publishers |
| 1980 | FARRIS LESTER | GTE General Telephone Company of California |

**1480 ALTA AVE N**

| Year | Uses | Source |
|---|---|---|
| 2003 | ROBERTS Raymond | Haines & Co Publishers |

**1486 ALTA AVE N**

| Year | Uses | Source |
|---|---|---|
| 2003 | WENTZ James | Haines & Co Publishers |

**1490 ALTA AVE N**

| Year | Uses | Source |
|---|---|---|
| 2003 | NORDEN Glenn A | Haines & Co Publishers |
| 1995 | Norden Glenn A | GTE Directories |
| 1985 | NORDEN GLENN | GTE |
| 1980 | NORDEN GLENN | GTE General Telephone Company of California |

# FINDINGS

**1498 ALTA AVE N**

| Year | Uses | Source |
|---|---|---|
| 2003 | FENG Chao | Haines & Co Publishers |
| 1985 | GREEN ALAN | GTE |
| 1980 | GREEN ALAN | GTE General Telephone Company of California |

## CARLOS WAY

**1485 CARLOS WAY**

| Year | Uses | Source |
|---|---|---|
| 2008 | LEE Pi ling | Haines Company, Inc. |
| 2003 | LEE Pi | Haines & Co Publishers |
| | CHEN Brian | Haines & Co Publishers |

**1488 CARLOS WAY**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | CAFORIO Lucien | Haines & Co Publishers |
| 1990 | GLC CONSTRUCTION & ELECTRICAL CONTRACTING CO | GTE |
| 1985 | G L C ELECTRIC | GTE |
| | CAFORIO GARY | GTE |
| 1980 | +G L C ELECTRIC | GTE General Telephone Company of California |
| | CAFORIA GARY | GTE General Telephone Company of California |

**1489 CARLOS WAY**

| Year | Uses | Source |
|---|---|---|
| 2008 | HARRIS Jeanie | Haines Company, Inc. |
| 2003 | HARRIS Jeanie | Haines & Co Publishers |

**1495 CARLOS WAY**

| Year | Uses | Source |
|---|---|---|
| 2008 | GUIZAR Raul | Haines Company, Inc. |
| 2003 | GUIZAR Raul | Haines & Co Publishers |
| 1980 | DUFFIN BARRY | GTE General Telephone Company of California |

**1496 CARLOS WAY**

| Year | Uses | Source |
|---|---|---|
| 2008 | CARTER Thos | Haines Company, Inc. |

# FINDINGS

| Year | Uses | Source |
|---|---|---|
| 2008 | CARTER Thomas | Haines Company, Inc. |
| 2003 | CARTER Kathleen | Haines & Co Publishers |
| | CARTER Thos | Haines & Co Publishers |
| | CARTER Thomas | Haines & Co Publishers |
| 1995 | Carter Kathleen | GTE Directories |
| 1990 | Carter Thos E | GTE |
| 1985 | CARTER THOS E | GTE |
| 1980 | CARTER THOS E | GTE General Telephone Company of California |

## E 15TH PL

**1345 E 15TH PL**

| Year | Uses | Source |
|---|---|---|
| 1990 | Buelow Paul I Cucmga | GTE |
| | Buell S | GTE |

**1377 E 15TH PL**

| Year | Uses | Source |
|---|---|---|
| 1990 | Ferree Philip | GTE |

**1422 E 15TH PL**

| Year | Uses | Source |
|---|---|---|
| 1990 | Jones Walter | GTE |

## E 15TH ST

**1190 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 1951 | Minlen H | Los Angeles Directory Company Publishers |

**1310 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 1951 | Jenison Ti I | Los Angeles Directory Company Publishers |

**1335 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 1990 | Hudson Joe | GTE |

# FINDINGS

**1345 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 1985 | BUELL SUSAN | GTE |
| 1980 | MUTSCHLER JOHN | GTE General Telephone Company of California |

**1353 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | GONZALEZ Jose | Haines Company, Inc. |
| 1995 | ALEXOPOUSLOS PRODUCE | GTE Directories |

**1361 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | DENNIS Roderick | Haines Company, Inc. |
| | D I TECHNOLOGIES | Haines Company, Inc. |
| 1990 | Lee Seung | GTE |
| | Lee Seung & Shin Dmnd Bar | GTE |
| 1985 | WILK DOROTHY | GTE |

**1367 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | HILL Jenny | Haines Company, Inc. |
| 1995 | Hein Nick | GTE Directories |
| 1990 | Michael | GTE |
| | Hedahl E | GTE |
| | Ji i oe | GTE |
| | Hedahl E | GTE |
| | M Nein | GTE |
| | n N Ont | GTE |

**1377 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | FERREE Philip | Haines Company, Inc. |

**1385 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | STANLEY Ronny | Haines Company, Inc. |
| 1985 | COPENHAVER RON | GTE |

# FINDINGS

**1390 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 1951 | Genung E 3 H | Los Angeles Directory Company Publishers |
| | f Mountain v lynterseets | Los Angeles Directory Company Publishers |

**1393 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | CRAIG Veronica | Haines Company, Inc. |

**1405 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | DONOHUE Connie | Haines Company, Inc. |
| 1990 | Henkel Andrew F | GTE |
| | i Henkel Donald C | GTE |

**1406 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | HANCOCK Susan | Haines Company, Inc. |
| 1975 | Cowell HD | GTE Directories |
| 1970 | COWELL H D | General Telephone Company of California |
| 1964 | Morton Don L Donna | Luskey Brothers & Co |

**1411 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | VITAL Zandre | Haines Company, Inc. |
| 1990 | Johnson Z & M | GTE |
| 1980 | ENSMINGIER IVAR | GTE General Telephone Company of California |

**1412 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | VIOLET Curt | Haines Company, Inc. |
| 1995 | Violet Albert G | GTE Directories |
| 1990 | Violet Albert G | GTE |
| 1985 | VIOLET ALBERT G | GTE |
| 1980 | SPARKS ROBT | GTE General Telephone Company of California |
| 1970 | RENAKER WILLIAM H | General Telephone Company of California |
| 1964 | Watson Ann E Mrs | Luskey Brothers & Co |
| | Watson Edw E Ann | Luskey Brothers & Co |
| 1960 | Violet Albert G | General Telephone Company Publishers |
| | Violet Albert G | General Telephone Company Publishers |

# FINDINGS

**1421 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | NGUYEN Ha | Haines Company, Inc. |

**1422 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | SHARP Wayne | Haines Company, Inc. |
| 1985 | JONES WALTER | GTE |
| 1964 | Brennan Patrick J Jean | Luskey Brothers & Co |
| 1960 | Brennan Patrick J | General Telephone Company Publishers |
| | Brennan Patrick J | General Telephone Company Publishers |

**1429 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | LEE Peter | Haines Company, Inc. |
| 1990 | Lee Yong | GTE |
| 1985 | GARCIA MARIE | GTE |
| 1980 | GARCIA TONY H | GTE General Telephone Company of California |

**1432 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | ABRIL Daniel | Haines Company, Inc. |
| 1990 | Lee Jerry | GTE |
| 1985 | LEE JERRY | GTE |
| 1980 | RUIZ RAMIRO | GTE General Telephone Company of California |
| 1975 | Schwarzbach Martin M | GTE Directories |
| 1964 | Grovhoug Herbt B Bernice | Luskey Brothers & Co |
| | Grovhoug Karen M | Luskey Brothers & Co |
| 1960 | Grovhoug Herbert B | General Telephone Company Publishers |
| | Grovhoug Herbert B | General Telephone Company Publishers |

**1437 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | GONZALEZ Belen | Haines Company, Inc. |

**1442 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | AMOUDEH Hedayat | Haines Company, Inc. |
| 1964 | Lezak John C Frances | Luskey Brothers & Co |
| 1960 | Lezak John C | General Telephone Company Publishers |

# FINDINGS

| Year | Uses | Source |
|---|---|---|
| 1960 | Lezak John C | General Telephone Company Publishers |

**1443 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | AFOEJU Ifeoma | Haines Company, Inc. |

**1447 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | RES CARE INC | Haines Company, Inc. |
| | RES CARE INC | Haines Company, Inc. |
| 1995 | Dourney Pat | GTE Directories |
| 1975 | Avery Donald | GTE Directories |
| 1964 | Avery Donald F Katharina | Luskey Brothers & Co |

**1448 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | GARCIA Sergio | Haines Company, Inc. |
| 1980 | NEIHART DEBBIE | GTE General Telephone Company of California |
| | NEIHART JANICE | GTE General Telephone Company of California |
| 1975 | Neihart Janice | GTE Directories |
| 1964 | Tramontana Jos C Agnes | Luskey Brothers & Co |

**1454 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 1964 | P PBH Construction | Luskey Brothers & Co |

**1457 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | WATSON Diane | Haines Company, Inc. |
| | WATSON Bryan | Haines Company, Inc. |
| 1964 | Hernandez Pete B Vel ia | Luskey Brothers & Co |

**1458 E 15TH ST**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 1995 | Leahy Terri | GTE Directories |
| 1980 | DULANEY TAMAR | GTE General Telephone Company of California |
| 1964 | Godfrey Jos D Mary | Luskey Brothers & Co |
| 1960 | Waters Danl H | General Telephone Company Publishers |

| Year | Uses | Source |
|---|---|---|
| 1960 | Waters Danl H | General Telephone Company Publishers |

## E JUANITA CT

### 1405 E JUANITA CT

| Year | Uses | Source |
|---|---|---|
| 1964 | Roberts Sam I W Wanda | Luskey Brothers & Co |
| | Roberts Wanda M Mrs | Luskey Brothers & Co |

### 1406 E JUANITA CT

| Year | Uses | Source |
|---|---|---|
| 1964 | Walkup Richd D | Luskey Brothers & Co |
| | Woods Robt W Louella | Luskey Brothers & Co |

## JUANITA CT

### 1405 JUANITA CT

| Year | Uses | Source |
|---|---|---|
| 2008 | RAHMANI Mike | Haines Company, Inc. |
| 2003 | RAHMANI Mike | Haines & Co Publishers |
| 1985 | EBERHARDT TERRY | GTE |
| 1980 | EBERHARDT T J | GTE General Telephone Company of California |
| 1975 | Eberhardt T J | GTE Directories |
| 1960 | Roberts Saml | General Telephone Company Publishers |
| | Roberts Saml | General Telephone Company Publishers |

## MONTE VERDE AVE

### 1475 MONTE VERDE AVE

| Year | Uses | Source |
|---|---|---|
| 2008 | PETRILLI P A | Haines Company, Inc. |
| | PETRILLO Peter | Haines Company, Inc. |
| 2003 | PETRILLI P A | Haines & Co Publishers |
| | PETRILLO Peter | Haines & Co Publishers |
| 1970 | CALHOUN KENNETH | General Telephone Company of California |

### 1479 MONTE VERDE AVE

| Year | Uses | Source |
|---|---|---|
| 2008 | CADAR Livius | Haines Company, Inc. |
| 2003 | MANGUSH Mohamed | Haines & Co Publishers |

| Year | Uses | Source |
|---|---|---|
| 1980 | MURAD G | GTE General Telephone Company of California |
| 1975 | Murad Robt | GTE Directories |
| 1960 | Herman Gilbert F Rev | General Telephone Company Publishers |
| | Herman Gilbert F Rev | General Telephone Company Publishers |

## Monte Verde Ave

**1483 Monte Verde Ave**

| Year | Uses | Source |
|---|---|---|
| 2014 | LOS TIGRES DEL NORTE | EDR Digital Archive |
| 2010 | LOS TIGRES DEL NORTE | EDR Digital Archive |

## MONTE VERDE AVE

**1483 MONTE VERDE AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | BRUST Regina | Haines Company, Inc. |
| 2003 | BRUST Regina | Haines & Co Publishers |

**1485 MONTE VERDE AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | RASOOL Imtiaz | Haines Company, Inc. |
| 2003 | HUGHES N D L | Haines & Co Publishers |
| 1990 | Hughes N D L | GTE |
| 1985 | HUGHES N D L | GTE |
| 1980 | HUGHES NEIL D L | GTE General Telephone Company of California |
| 1975 | Hughes Neil D L | GTE Directories |
| 1960 | Indonesia House | General Telephone Company Publishers |
| | Breman John G Dr | General Telephone Company Publishers |
| | Indonesia House | General Telephone Company Publishers |
| | Breman John G Dr | General Telephone Company Publishers |

## MONTE VERDE ST

**1483 MONTE VERDE ST**

| Year | Uses | Source |
|---|---|---|
| 1960 | Saunders David 0 | General Telephone Company Publishers |
| | Saunders David 0 | General Telephone Company Publishers |

# FINDINGS

## N 13TH AVE

**1455 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | STEINKE Kirk | Haines Company, Inc. |

**1461 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | WOLFE Kim | Haines Company, Inc. |

**1462 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | KOZIEL Robbin | Haines Company, Inc. |

**1468 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | AGUILERA Jeanne | Haines Company, Inc. |

## N 13th Ave

**1469 N 13th Ave**

| Year | Uses | Source |
|---|---|---|
| 2014 | HAYDEN MATTHEW | EDR Digital Archive |
| 2010 | HAYDEN MATTHEW | EDR Digital Archive |

## N 13TH AVE

**1469 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | HAYDEN Matthew | Haines Company, Inc. |

**1474 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | GALVEZ Richard | Haines Company, Inc. |

**1475 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | MCGEE William | Haines Company, Inc. |

**1480 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | MERRILL Jeffrey | Haines Company, Inc. |

# FINDINGS

## N 13th Ave

**1483 N 13th Ave**

| Year | Uses | Source |
|---|---|---|
| 2010 | BRODY STANLEY | EDR Digital Archive |

## N 13TH AVE

**1483 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | BRODY Stan | Haines Company, Inc. |

**1487 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | GATELEY John | Haines Company, Inc. |

**1496 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | BETANCOURT Jesus | Haines Company, Inc. |
| 1990 | Betancourt Jose A Pma | GTE |
| | Betancourt Jesus | GTE |

## N 13th Ave

**1497 N 13th Ave**

| Year | Uses | Source |
|---|---|---|
| 2010 | ARTISTIC VIDEO PRODUCTION | EDR Digital Archive |

## N 13TH AVE

**1497 N 13TH AVE**

| Year | Uses | Source |
|---|---|---|
| 2008 | SICILIA Alexander | Haines Company, Inc. |
| 1995 | Sicliia Alexander | GTE Directories |
| 1990 | Sicilia Alexander | GTE |

## N ALTA AVE

**1498 N ALTA AVE**

| Year | Uses | Source |
|---|---|---|
| 1990 | Tremayne R | GTE |

# FINDINGS

## N MONTE VERDE AVE

**1475 N MONTE VERDE AVE**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1964 | Mowry Joyce M Mrs | Luskey Brothers & Co |
| | Mowry De Witt Joyce | Luskey Brothers & Co |

**1485 N MONTE VERDE AVE**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1964 | Breman John G Anna | Luskey Brothers & Co |

## S UPLAND HILLS DR

**1226 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Lewis Kathleen & Wm | GTE Directories |
| | H xt Kathleen F | GTE Directories |

**1230 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Mart In Chas | GTE Directories |

**1237 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Nelson Robt | GTE Directories |

**1246 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Greenberg Dennlse | GTE Directories |

**1254 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Sacher Robt | GTE Directories |

**1263 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Mansour Samir | GTE Directories |

**1275 S UPLAND HILLS DR**

| *Year* | *Uses* | *Source* |
|---|---|---|
| 1995 | Murphy Eileen M | GTE Directories |

# FINDINGS

**1282 S UPLAND HILLS DR**

| Year | Uses | Source |
|---|---|---|
| 1995 | Newman Alan | GTE Directories |

**1285 S UPLAND HILLS DR**

| Year | Uses | Source |
|---|---|---|
| 1995 | Swarzkopf John | GTE Directories |

**1287 S UPLAND HILLS DR**

| Year | Uses | Source |
|---|---|---|
| 1995 | Rose David A | GTE Directories |

**1328 S UPLAND HILLS DR**

| Year | Uses | Source |
|---|---|---|
| 1995 | Scott Walter | GTE Directories |

**1336 S UPLAND HILLS DR**

| Year | Uses | Source |
|---|---|---|
| 1995 | Maler Leo | GTE Directories |
| | TFITURES INC | GTE Directories |

## Upland Hills Dr S

**1212 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2010 | COMPUTER SUPPLIES | EDR Digital Archive |

## UPLAND HILLS DR S

**1218 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | HOLLINGSWORT James | Haines Company, Inc. |
| 2003 | FREELAND Dianne | Haines & Co Publishers |

**1219 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | GILLETT Merle | Haines Company, Inc. |
| 2003 | BURNS Bruce | Haines & Co Publishers |

**1222 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | EVANS James | Haines Company, Inc. |

| Year | Uses | Source |
|---|---|---|
| 2003 | EVANS James | Haines & Co Publishers |
| | ARTISAN SCREEN PROCESS INC | Haines & Co Publishers |

**1223 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | AYERS Gordon | Haines & Co Publishers |

**1226 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |

**1227 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | SWENSON Jerry L | Haines Company, Inc. |
| 2003 | SWENSON Jerry L | Haines & Co Publishers |

**1229 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | SHAMBURG Willalm | Haines Company, Inc. |
| 2003 | SHAMBURG Willaim | Haines & Co Publishers |

## Upland Hills Dr S

**1230 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2014 | MARTIN ASSOC | EDR Digital Archive |
| 2010 | MARTIN ASSOC | EDR Digital Archive |

## UPLAND HILLS DR S

**1230 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | COSTA James | Haines Company, Inc. |
| 2003 | COSTA James | Haines & Co Publishers |

**1233 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | BARRON Francisco | Haines Company, Inc. |
| 2003 | LOPEZ Paul | Haines & Co Publishers |

# FINDINGS

## Upland Hills Dr S

**1234 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2014 | DREAM TEAM TRUSS DSGN ENG & CO | EDR Digital Archive |
| 2010 | DREAM TEAM TRUSS DSGN ENG & CO | EDR Digital Archive |

## UPLAND HILLS DR S

**1234 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | FORTIN Louis | Haines & Co Publishers |

**1237 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | BEEBE Diane | Haines Company, Inc. |
| 2003 | BEEBE Diane | Haines & Co Publishers |

**1238 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | FRAZIER Norman | Haines Company, Inc. |
| 2003 | FRAZIER Norman | Haines & Co Publishers |

**1242 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | HANSEN James | Haines Company, Inc. |
| 2003 | HANSEN James | Haines & Co Publishers |

**1243 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | DORAN Carter | Haines & Co Publishers |

## Upland Hills Dr S

**1246 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2014 | MUNSON VELIA O | EDR Digital Archive |

# FINDINGS

## UPLAND HILLS DR S

### 1246 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | GREENBERG D | Haines Company, Inc. |
| | LENARZ Kimberly | Haines Company, Inc. |
| 2003 | ERTON Marjorie | Haines & Co Publishers |
| | GREENBERG D | Haines & Co Publishers |

### 1247 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | SCHNOBRICH Larry | Haines Company, Inc. |
| 2003 | SCHNOBRICH Larry | Haines & Co Publishers |

### 1250 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | KIRKPATRICK Julie | Haines Company, Inc. |
| | KIRKPATRICK Tom | Haines Company, Inc. |
| | MACIAS Antonio | Haines Company, Inc. |
| 2003 | MACIAS Antonio | Haines & Co Publishers |

### 1251 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | BEIN Dennis | Haines Company, Inc. |
| 2003 | BEIN Dennis | Haines & Co Publishers |

### 1254 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | SACHER Robt | Haines Company, Inc. |
| 2003 | SACHER Robt | Haines & Co Publishers |

### 1255 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | SHAW Bryan | Haines Company, Inc. |
| 2003 | SCUTRO Arthur | Haines & Co Publishers |

### 1256 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | COPENHAVER Mary | Haines Company, Inc. |
| 2003 | COPENHAVER Mary | Haines & Co Publishers |

# FINDINGS

**1259 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | TISLER Elna | Haines & Co Publishers |

**1260 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | ROGERS Steve | Haines Company, Inc. |
| 2003 | FISKE Jerry | Haines & Co Publishers |

## Upland Hills Dr S

**1263 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2014 | MANSOUR SAMIR F | EDR Digital Archive |
| 2010 | MANSOUR SAMIR F | EDR Digital Archive |

## UPLAND HILLS DR S

**1263 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | MANSOUR Samir | Haines Company, Inc. |
| 2003 | MANSOUR Samir | Haines & Co Publishers |

**1267 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | WARREN Douglas | Haines Company, Inc. |

**1268 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | ANDERSON Buel A | Haines Company, Inc. |
| 2003 | ANDERSON Buel A | Haines & Co Publishers |

## Upland Hills Dr S

**1271 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2010 | ACME800 | EDR Digital Archive |

# FINDINGS

## UPLAND HILLS DR S

### 1271 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | TORLUCCI Ralph | Haines Company, Inc. |
| | TORLUCCI Julia | Haines Company, Inc. |
| 2003 | TORLUCCI Julia | Haines & Co Publishers |
| | TORLUCCI Julia | Haines & Co Publishers |
| | TORLUCCI Ralph | Haines & Co Publishers |
| | TORLUCCI Ralph | Haines & Co Publishers |

### 1272 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | GROENDYKE David | Haines Company, Inc. |
| 2003 | GROENDYKE David | Haines & Co Publishers |

### 1275 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | MURPHY Eileen | Haines Company, Inc. |
| 2003 | MURPHY Eileen | Haines & Co Publishers |

### 1276 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | PARKER Joe | Haines Company, Inc. |
| 2003 | JACOBSEN Mark | Haines & Co Publishers |

## Upland Hills Dr S

### 1277 Upland Hills Dr S

| Year | Uses | Source |
|---|---|---|
| 2014 | DOUGLAS J BESETH MD | EDR Digital Archive |

## UPLAND HILLS DR S

### 1277 UPLAND HILLS DR S

| Year | Uses | Source |
|---|---|---|
| 2008 | LOVELADY Phillip | Haines Company, Inc. |
| 2003 | YUHAS John | Haines & Co Publishers |
| | LOVELADY Phillip | Haines & Co Publishers |
| | BORNMANN M | Haines & Co Publishers |

# FINDINGS

**1278 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | WHYTE Michael | Haines Company, Inc. |
| 2003 | WHYTE Michael | Haines & Co Publishers |

**1281 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | KILPATRICK Iris | Haines Company, Inc. |
| 2003 | NOEL Margaret | Haines & Co Publishers |

**1282 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | RINEHART Larry | Haines Company, Inc. |
| 2003 | RINEHART Larry | Haines & Co Publishers |

**1285 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | LOVELESS Frances | Haines Company, Inc. |
| 2003 | XXXX | Haines & Co Publishers |

**1286 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | SAPP R M | Haines Company, Inc. |
| 2003 | SAPP R M | Haines & Co Publishers |

**1287 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | PHELPS Dorothy | Haines Company, Inc. |
| 2003 | ROSE David A | Haines & Co Publishers |

**1290 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |
| 2003 | ZAFUTO Charles | Haines & Co Publishers |

**1291 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | ELWELL P | Haines Company, Inc. |
| 2003 | ELWELL P | Haines & Co Publishers |

# FINDINGS

**1300 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | PORTER Gary | Haines Company, Inc. |

**1303 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | ROYLE Arthur | Haines Company, Inc. |

## Upland Hills Dr S

**1304 Upland Hills Dr S**

| Year | Uses | Source |
|---|---|---|
| 2014 | EMMINGER & ASSOCIATES | EDR Digital Archive |

## UPLAND HILLS DR S

**1311 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |

**1314 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | XXXX | Haines Company, Inc. |

**1315 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | WILSON Richard | Haines Company, Inc. |

**1322 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | COBLE Neal | Haines Company, Inc. |

**1332 UPLAND HILLS DR S**

| Year | Uses | Source |
|---|---|---|
| 2008 | GAIL M | Haines Company, Inc. |

## UPLAND HIS DR S

**1222 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Upfront Ticket Service | GTE |
| | Update Co | GTE |

# FINDINGS

**1226 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Heximer Melodie | GTE |
| | Next Kathleen F | GTE |

**1230 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Martin Chas | GTE |

**1233 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | YANG STANLEY W MD | GTE |
| | Yang Shan | GTE |

**1242 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Di Bella M D & Donna | GTE |

**1254 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Sacher Robt | GTE |

**1255 UPLAND HIS DR S**

| Year | Uses | Source |
|---|---|---|
| 1990 | Goblish Jas F | GTE |

# FINDINGS

## TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

| Address Researched | Address Not Identified in Research Source |
|---|---|
| East 15th Street/North 13th Avenue | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

## ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1190 E 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1208 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923 |
| 1212 Upland Hills Dr S | 2014, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1218 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1219 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1222 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1222 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1223 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1226 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1226 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1226 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1227 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1229 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1230 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1230 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1230 Upland Hills Dr S | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1230 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1233 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1233 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1234 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1234 Upland Hills Dr S | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1237 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1237 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1238 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1242 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1242 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1243 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1246 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1246 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1246 Upland Hills Dr S | 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1247 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1250 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1251 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1254 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1254 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1254 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1255 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1255 UPLAND HIS DR S | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1256 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1259 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1260 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1263 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1263 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1263 Upland Hills Dr S | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1267 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1268 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1271 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1271 Upland Hills Dr S | 2014, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1272 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1275 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1275 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1276 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1277 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1277 Upland Hills Dr S | 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1278 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1281 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1282 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1282 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1285 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1285 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1286 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1287 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1287 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1290 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1291 UPLAND HILLS DR S | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1300 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1303 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1304 Upland Hills Dr S | 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1310 E 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1311 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1314 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1315 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1322 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1328 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1332 UPLAND HILLS DR S | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1335 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1335 E 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1336 S UPLAND HILLS DR | 2014, 2010, 2008, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1345 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1345 E 15TH PL | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1345 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1353 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1353 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1361 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1361 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1367 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1367 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1377 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1377 E 15TH PL | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1377 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1378 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1385 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1385 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1390 E 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1393 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1393 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1405 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1405 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1405 E JUANITA CT | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1405 JUANITA CT | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1981, 1970, 1965, 1964, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1406 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1406 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1406 E JUANITA CT | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1411 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1411 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1412 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1412 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1991, 1981, 1975, 1965, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1421 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1421 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1422 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1422 E 15TH PL | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1422 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1981, 1980, 1975, 1970, 1965, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1429 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1429 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1432 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1432 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1981, 1970, 1965, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1437 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1437 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1442 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1442 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1443 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1443 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1447 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1447 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1980, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1448 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1448 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1454 E 15TH ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1455 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1455 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1457 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1457 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1458 15TH ST E | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1458 E 15TH ST | 2014, 2010, 2003, 2002, 1996, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1461 13TH AV M | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1461 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1461 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1462 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1462 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1468 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1468 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1469 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1469 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1469 N 13th Ave | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1474 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1474 ALTA AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1474 ALTA AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1474 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1475 13TH AV M | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1475 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1475 MONTE VERDE AVE | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1475 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1475 N MONTE VERDE AVE | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1479 MONTE VERDE AVE | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1970, 1965, 1964, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1480 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1480 ALTA AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1480 ALTA AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1480 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 MONTE VERDE AVE | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 Monte Verde Ave | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 MONTE VERDE ST | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1483 N 13th Ave | 2014, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1485 CARLOS WAY | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1485 MONTE VERDE AVE | 2014, 2010, 2002, 1996, 1995, 1991, 1981, 1970, 1965, 1964, 1961, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1485 N MONTE VERDE AVE | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1486 ALTA AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1486 Alta Ave | 2014, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1486 ALTA AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1487 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1487 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1488 CARLOS WAY | 2014, 2010, 2002, 1996, 1995, 1991, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1489 CARLOS WAY | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1490 ALTA AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1490 ALTA AVE N | 2014, 2010, 2008, 2002, 1996, 1991, 1990, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1495 CARLOS WAY | 2014, 2010, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1496 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1496 CARLOS WAY | 2014, 2010, 2002, 1996, 1991, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1496 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1497 13TH AV M | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1497 13TH AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

# FINDINGS

| Address Researched | Address Not Identified in Research Source |
|---|---|
| 1497 N 13th Ave | 2014, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1497 N 13TH AVE | 2014, 2010, 2003, 2002, 1996, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1498 ALTA AVE | 2014, 2010, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1498 Alta Ave | 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1498 ALTA AVE N | 2014, 2010, 2008, 2002, 1996, 1995, 1991, 1990, 1981, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |
| 1498 N ALTA AVE | 2014, 2010, 2008, 2003, 2002, 1996, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922 |

Upland Site

East 15th Street/North 13th Avenue

Upland, CA 91786

Inquiry Number: 5331724.4

June 14, 2018

# EDR Historical Topo Map Report

## with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

# EDR Historical Topo Map Report

06/14/18

**Site Name:**

Upland Site
East 15th Street/North 13th Av
Upland, CA 91786
EDR Inquiry # 5331724.4

**Client Name:**

Geotek
1548 North Maple Street
Corona, CA 92880
Contact: Anna M. Scott

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Geotek were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

***Search Results:***

**P.O.#** NA

**Project:** 1925-CR

***Coordinates:***

| | |
|---|---|
| **Latitude:** | 34.118806 34° 7' 8" North |
| **Longitude:** | -117.632694 -117° 37' 58" West |
| **UTM Zone:** | Zone 11 North |
| **UTM X Meters:** | 441653.11 |
| **UTM Y Meters:** | 3775509.78 |
| **Elevation:** | 1429.99' above sea level |

**Maps Provided:**

| | |
|---|---|
| 2012 | 1953, 1954 |
| 1995, 1996 | 1944 |
| 1988 | 1941, 1942 |
| 1980, 1981 | 1940 |
| 1976 | 1933 |
| 1973 | 1903 |
| 1966, 1967 | 1900 |
| 1954 | 1897 |

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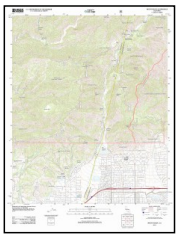
## *Topo Sheet Key*

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

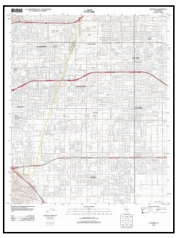
### 2012 Source Sheets



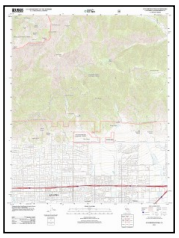
Guasti
2012
7.5-minute, 24000



Mount Baldy
2012
7.5-minute, 24000



Ontario
2012
7.5-minute, 24000

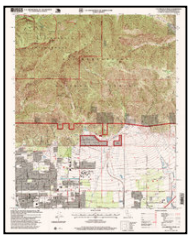


Cucamonga Peak
2012
7.5-minute, 24000

### 1995, 1996 Source Sheets



Mount Baldy
1995
7.5-minute, 24000
Aerial Photo Revised 1988



Cucamonga Peak
1996
7.5-minute, 24000
Aerial Photo Revised 1952

### 1988 Source Sheets

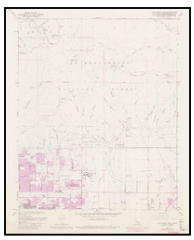


Cucamonga Peak
1988
7.5-minute, 24000
Aerial Photo Revised 1985



Mt. Baldy
1988
7.5-minute, 24000
Aerial Photo Revised 1985

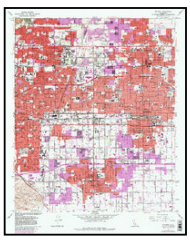
### 1980, 1981 Source Sheets



Cucamonga Peak
1980
7.5-minute, 24000
Aerial Photo Revised 1978



Guasti
1981
7.5-minute, 24000
Aerial Photo Revised 1978

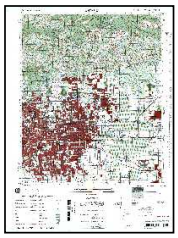


Ontario
1981
7.5-minute, 24000
Aerial Photo Revised 1978

## *Topo Sheet Key*

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

### 1976 Source Sheets



ONTARIO
1976
15-minute, 50000

### 1973 Source Sheets



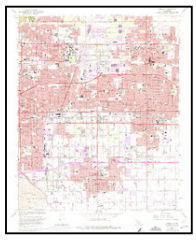
Cucamonga Peak
1973
7.5-minute, 24000
Aerial Photo Revised 1973



Guasti
1973
7.5-minute, 24000
Aerial Photo Revised 1973



Mt. Baldy
1973
7.5-minute, 24000
Aerial Photo Revised 1966



Ontario
1973
7.5-minute, 24000
Aerial Photo Revised 1973

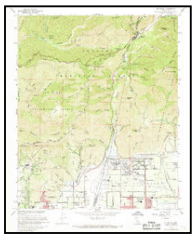
### 1966, 1967 Source Sheets



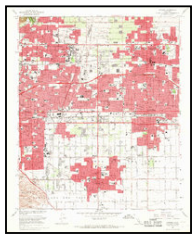
Cucamonga Peak
1966
7.5-minute, 24000
Aerial Photo Revised 1966



Guasti
1966
7.5-minute, 24000
Aerial Photo Revised 1966



Mt. Baldy
1967
7.5-minute, 24000
Aerial Photo Revised 1966



Ontario
1967
7.5-minute, 24000
Aerial Photo Revised 1966

### 1954 Source Sheets



Ontario
1954
15-minute, 62500

## *Topo Sheet Key*

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

### 1953, 1954 Source Sheets



Cucamonga Peak
1953
7.5-minute, 24000
Aerial Photo Revised 1952

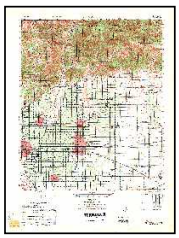


Guasti
1953
7.5-minute, 24000
Aerial Photo Revised 1952



Mt. Baldy
1954
7.5-minute, 24000
Aerial Photo Revised 1952

### 1944 Source Sheets



CUCAMONGA
1944
15-minute, 50000

### 1941, 1942 Source Sheets



GUASTI VICINITY
1941
7.5-minute, 31680



Ontario and Vicinity
1942
7.5-minute, 31680

### 1940 Source Sheets



Evey Canyon
1940
7.5-minute, 20000

## *Topo Sheet Key*

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

### 1933 Source Sheets



Ontario
1933
7.5-minute, 31680

### 1903 Source Sheets



Cucamonga
1903
15-minute, 62500

### 1900 Source Sheets



Cucamonga
1900
15-minute, 62500

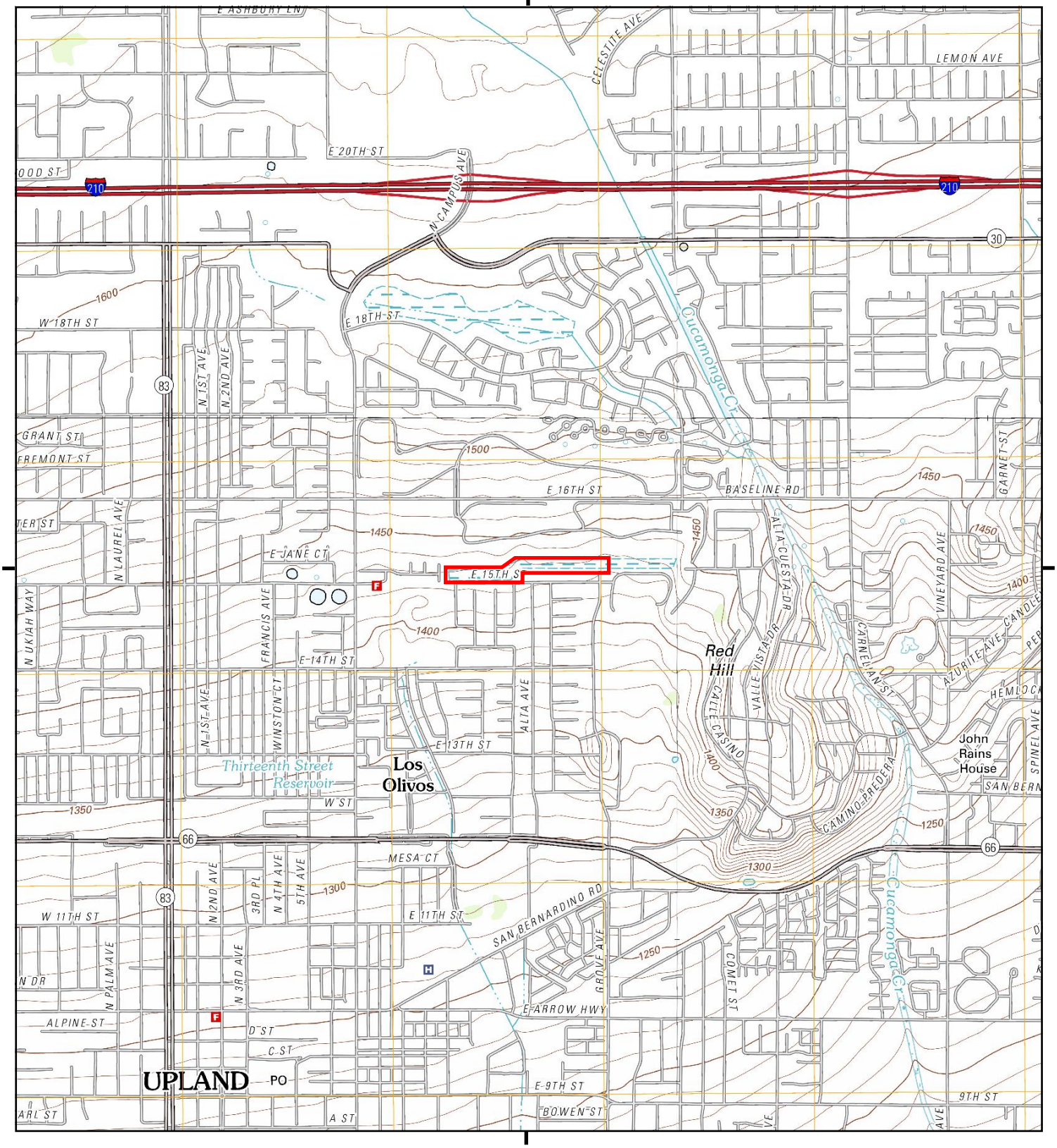
### 1897 Source Sheets



Cucamonga
1897
15-minute, 62500

# Historical Topo Map

2012




This report includes information from the following map sheet(s).

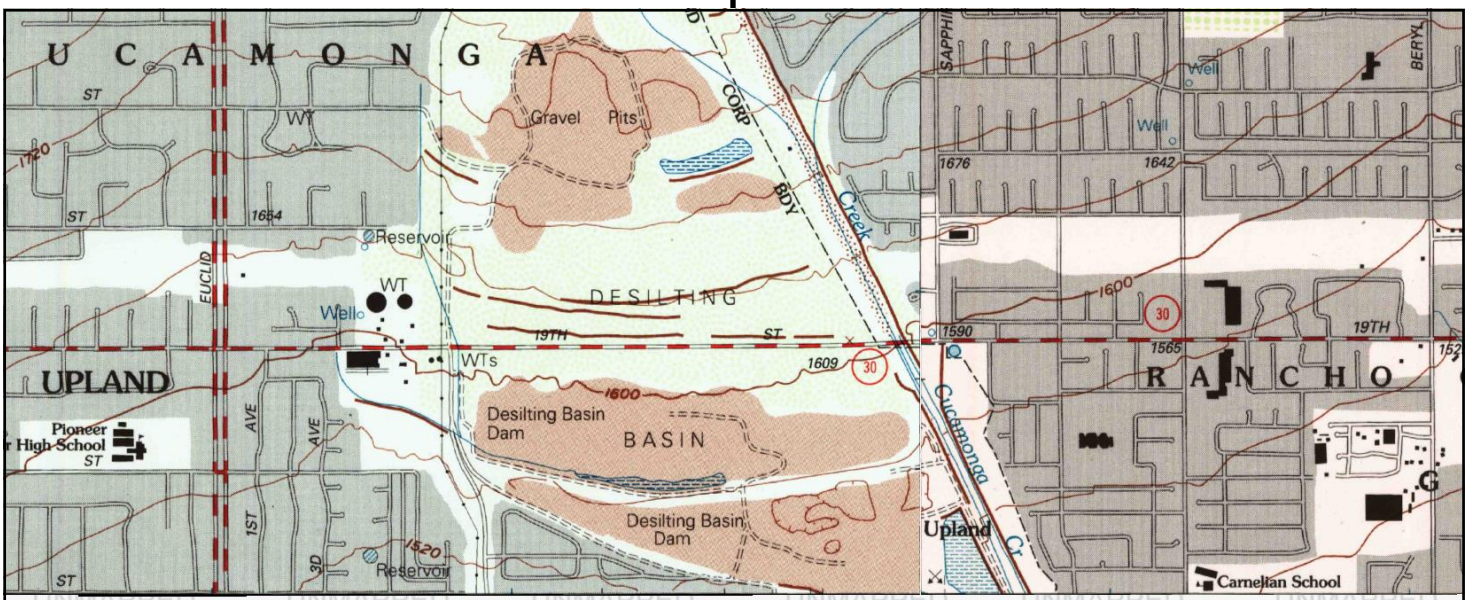
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Ontario, 2012, 7.5-minute
NE, Cucamonga Peak, 2012, 7.5-minute
SE, Guasti, 2012, 7.5-minute
NW, Mount Baldy, 2012, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




UNMAPPED

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

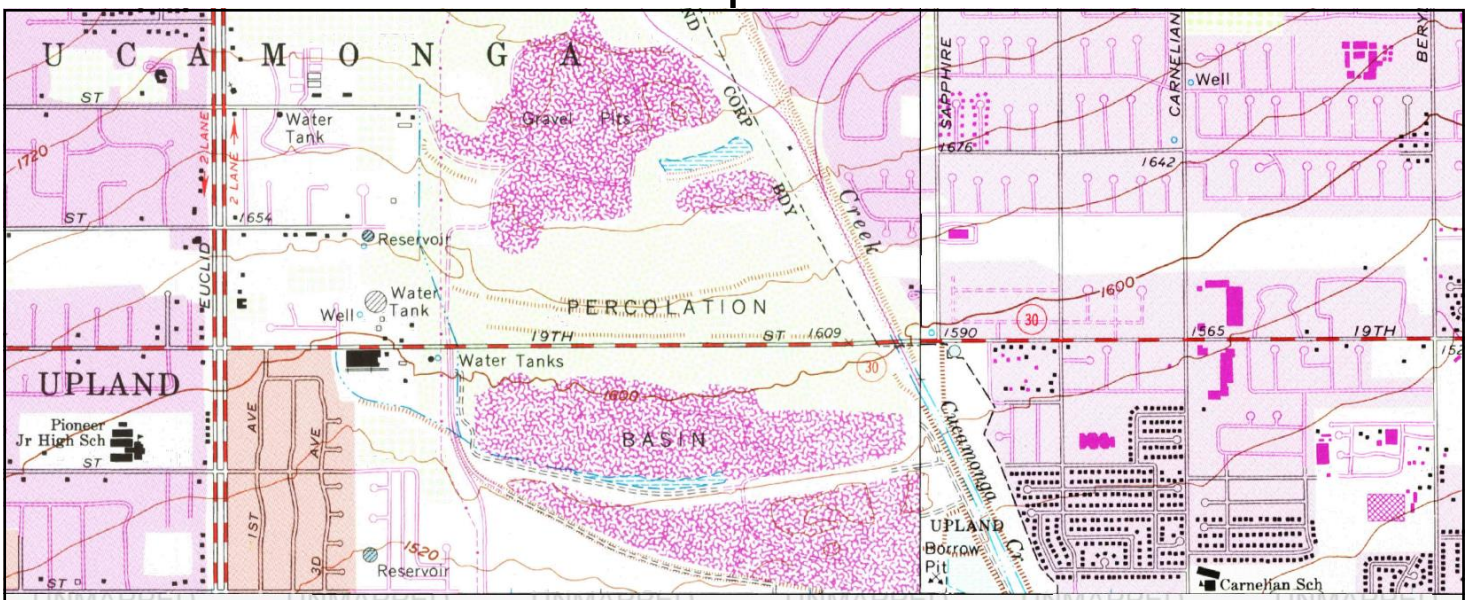
NE, Cucamonga Peak, 1996, 7.5-minute
NW, Mount Baldy, 1995, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1988




UNMAPPED

This report includes information from the following map sheet(s).

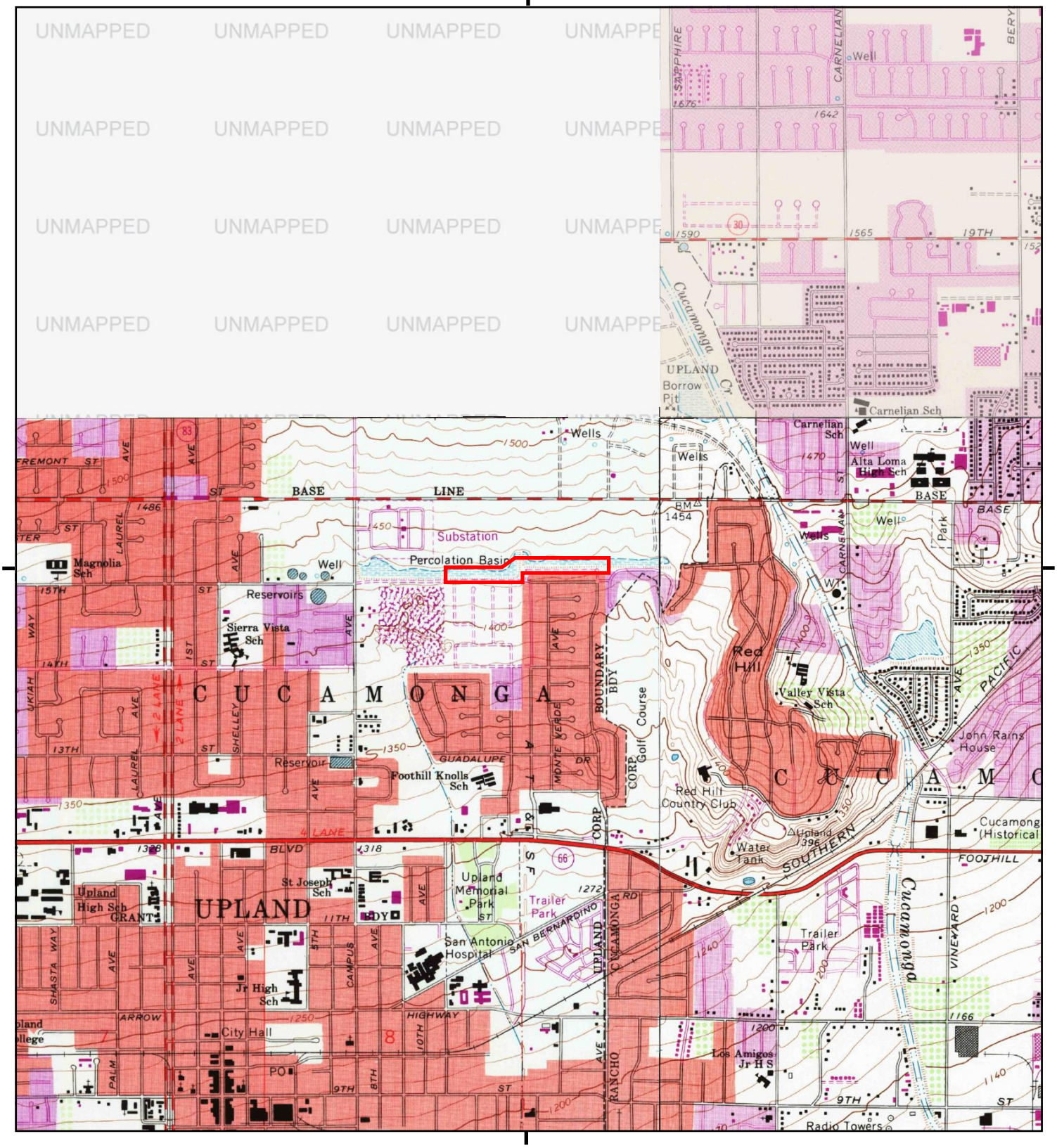
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

NE, Cucamonga Peak, 1988, 7.5-minute
NW, Mt. Baldy, 1988, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

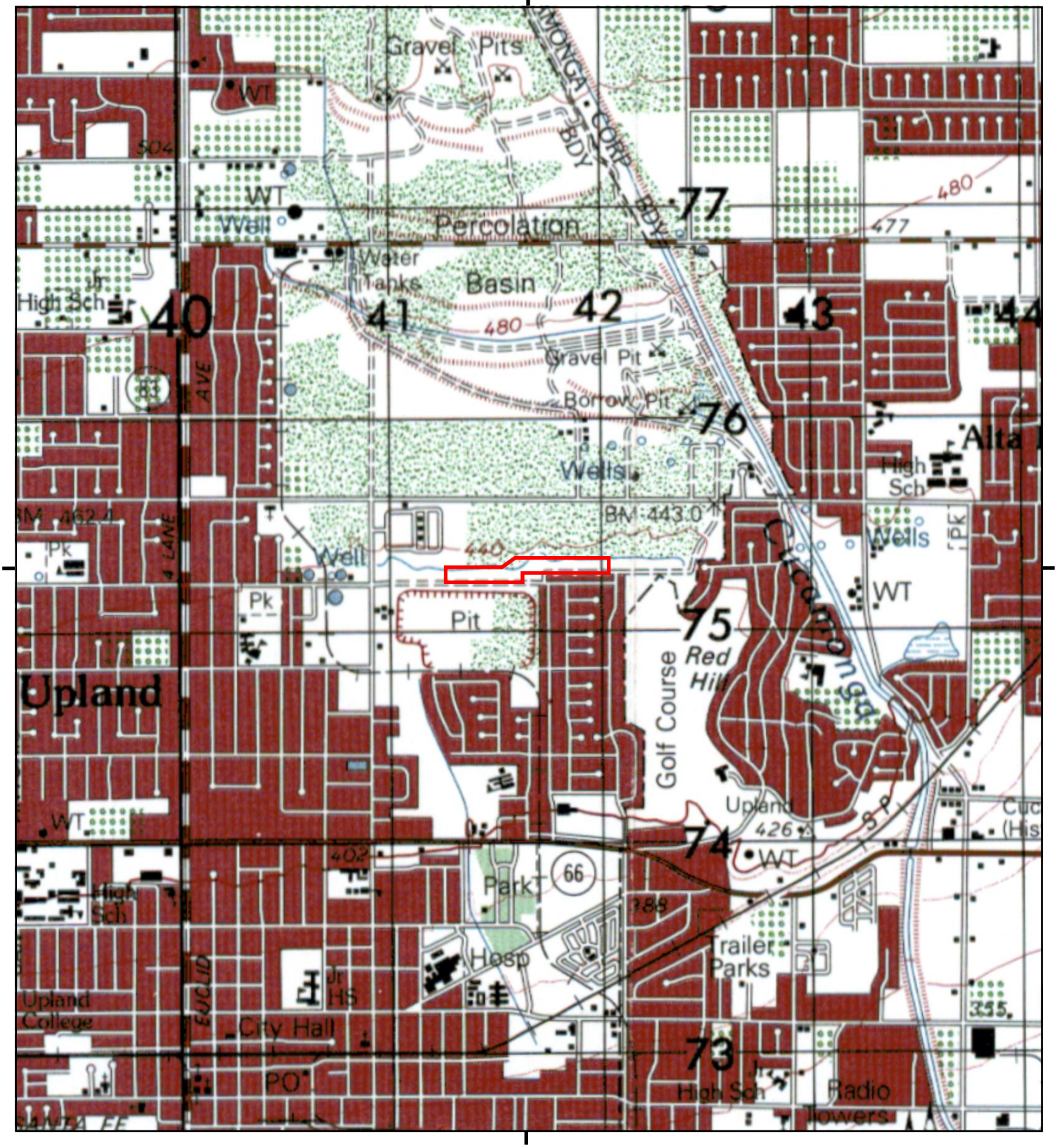
TP, Ontario, 1981, 7.5-minute
NE, Cucamonga Peak, 1980, 7.5-minute
SE, Guasti, 1981, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1976




This report includes information from the following map sheet(s).

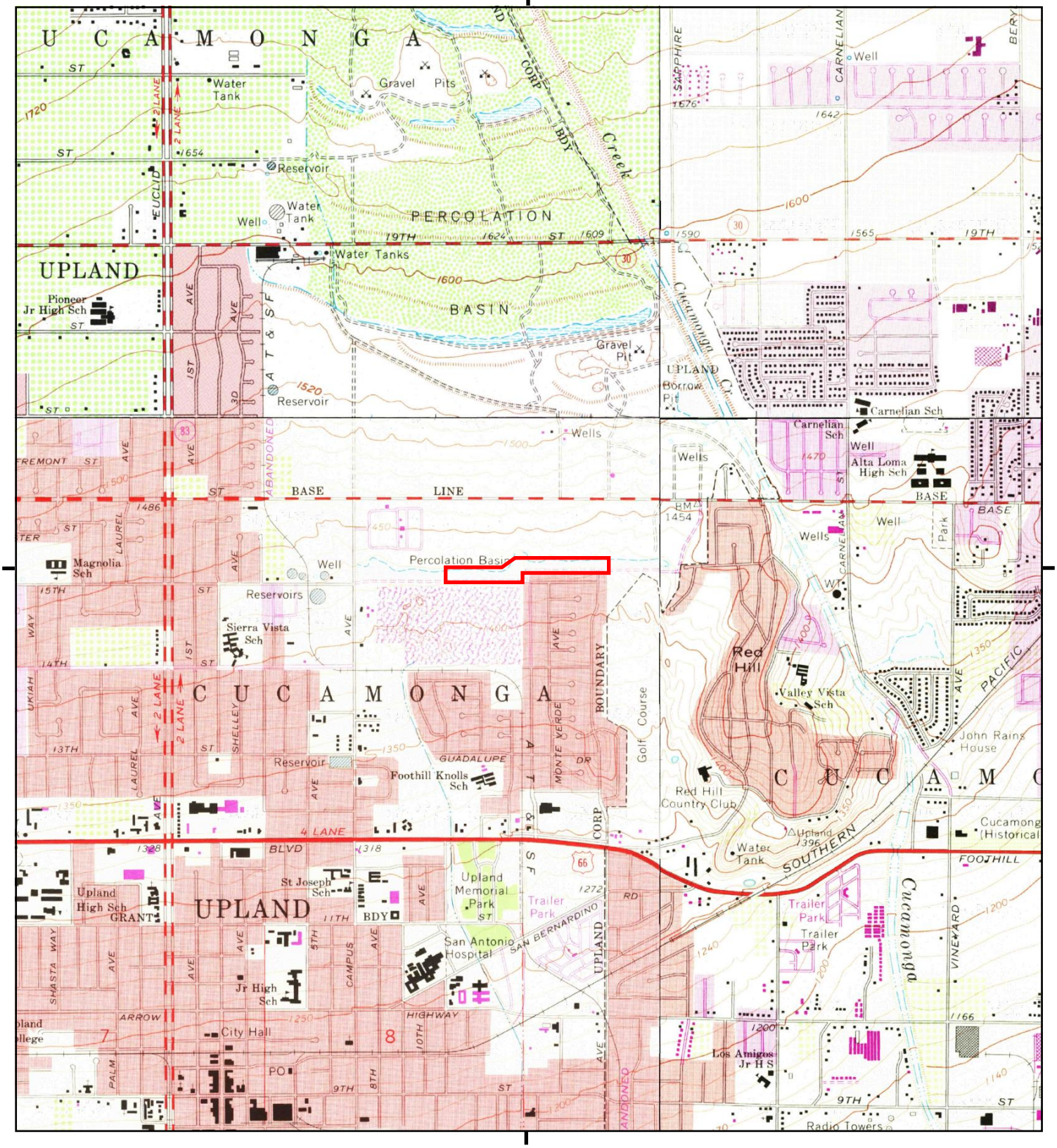
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, ONTARIO, 1976, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

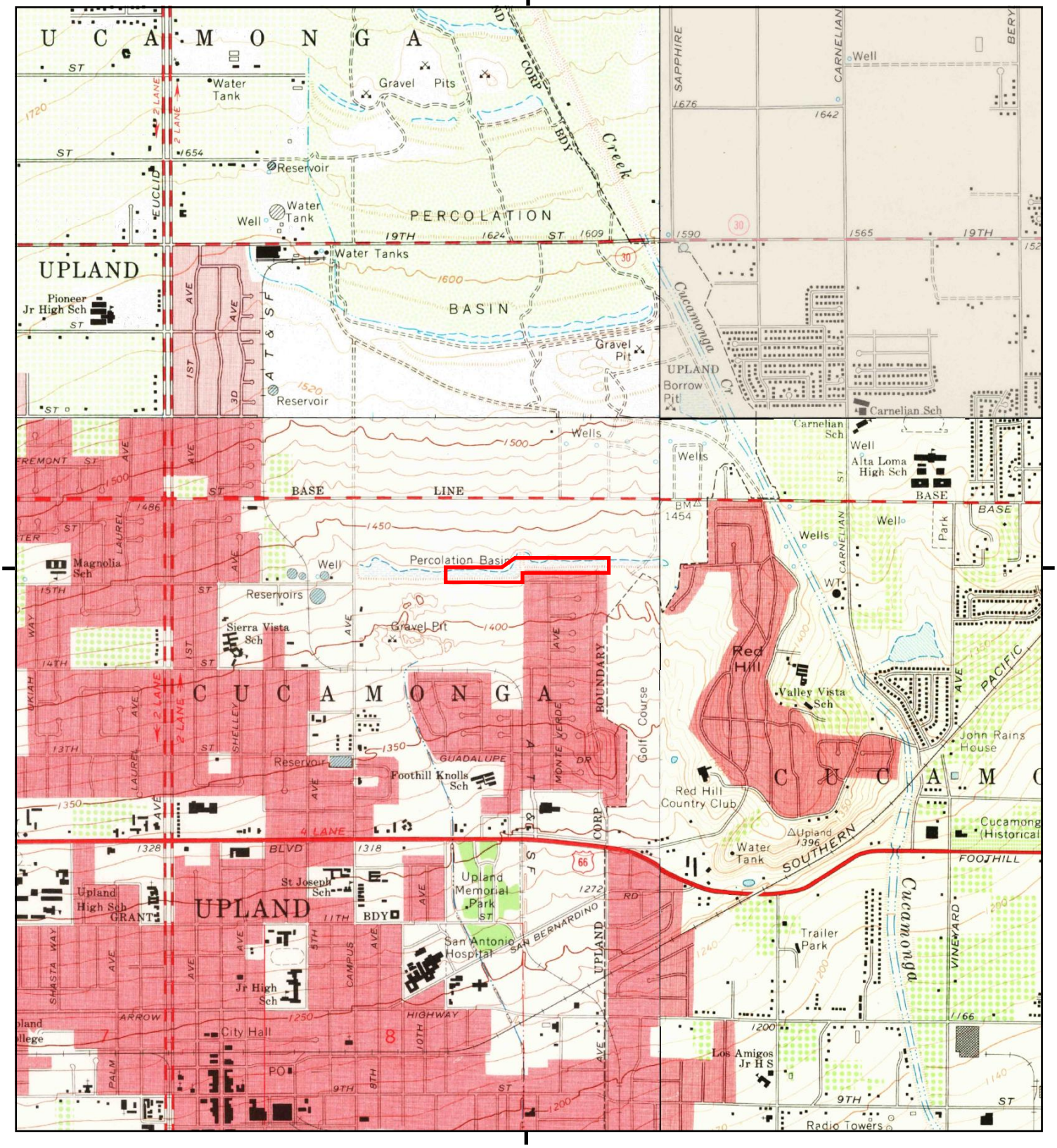
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Ontario, 1973, 7.5-minute
NE, Cucamonga Peak, 1973, 7.5-minute
SE, Guasti, 1973, 7.5-minute
NW, Mt. Baldy, 1973, 7.5-minute

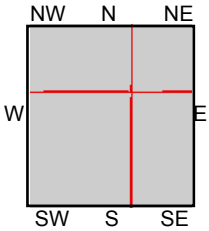
SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



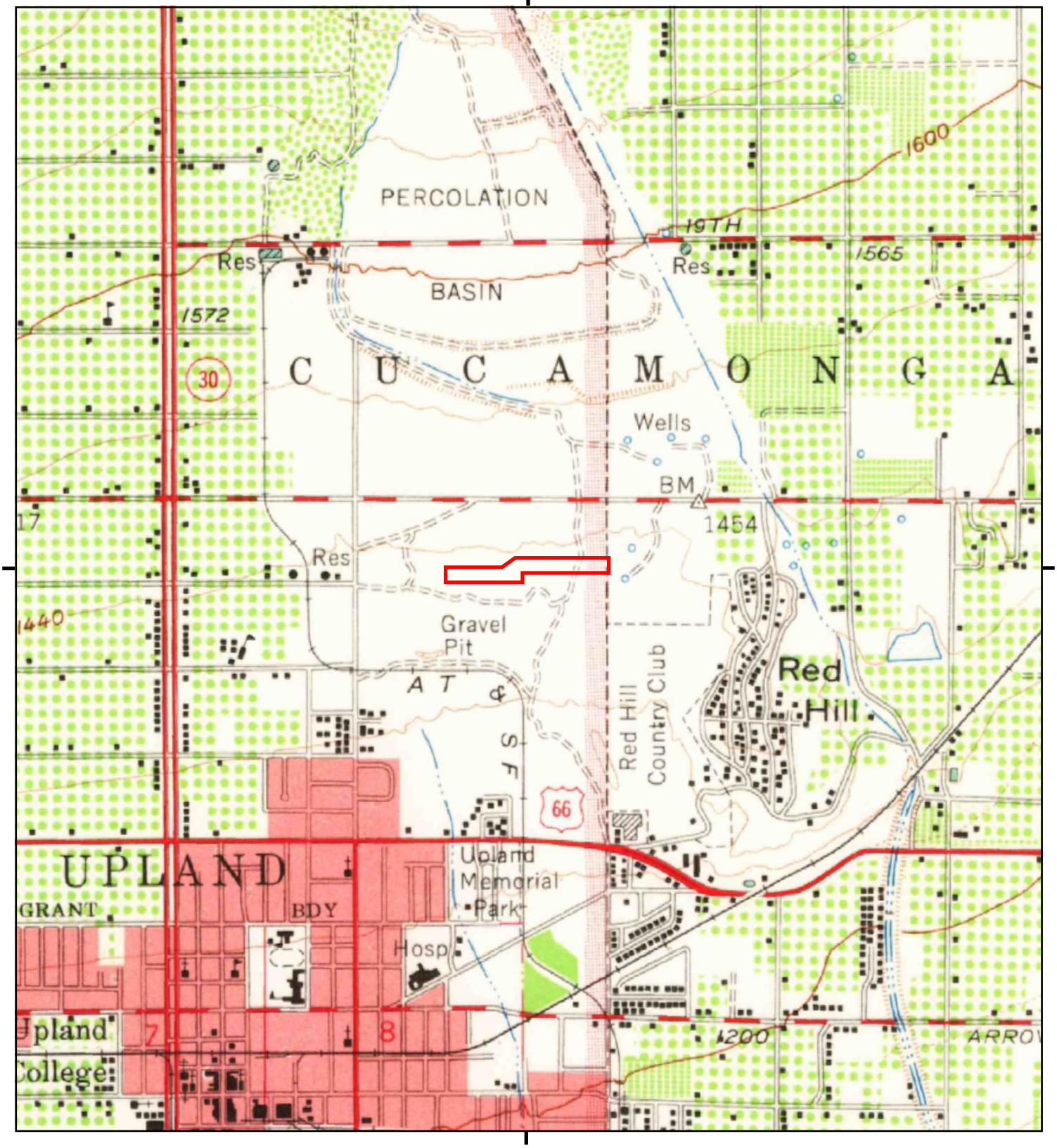

TP, Ontario, 1967, 7.5-minute
NE, Cucamonga Peak, 1966, 7.5-minute
SE, Guasti, 1966, 7.5-minute
NW, Mt. Baldy, 1967, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1954




This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

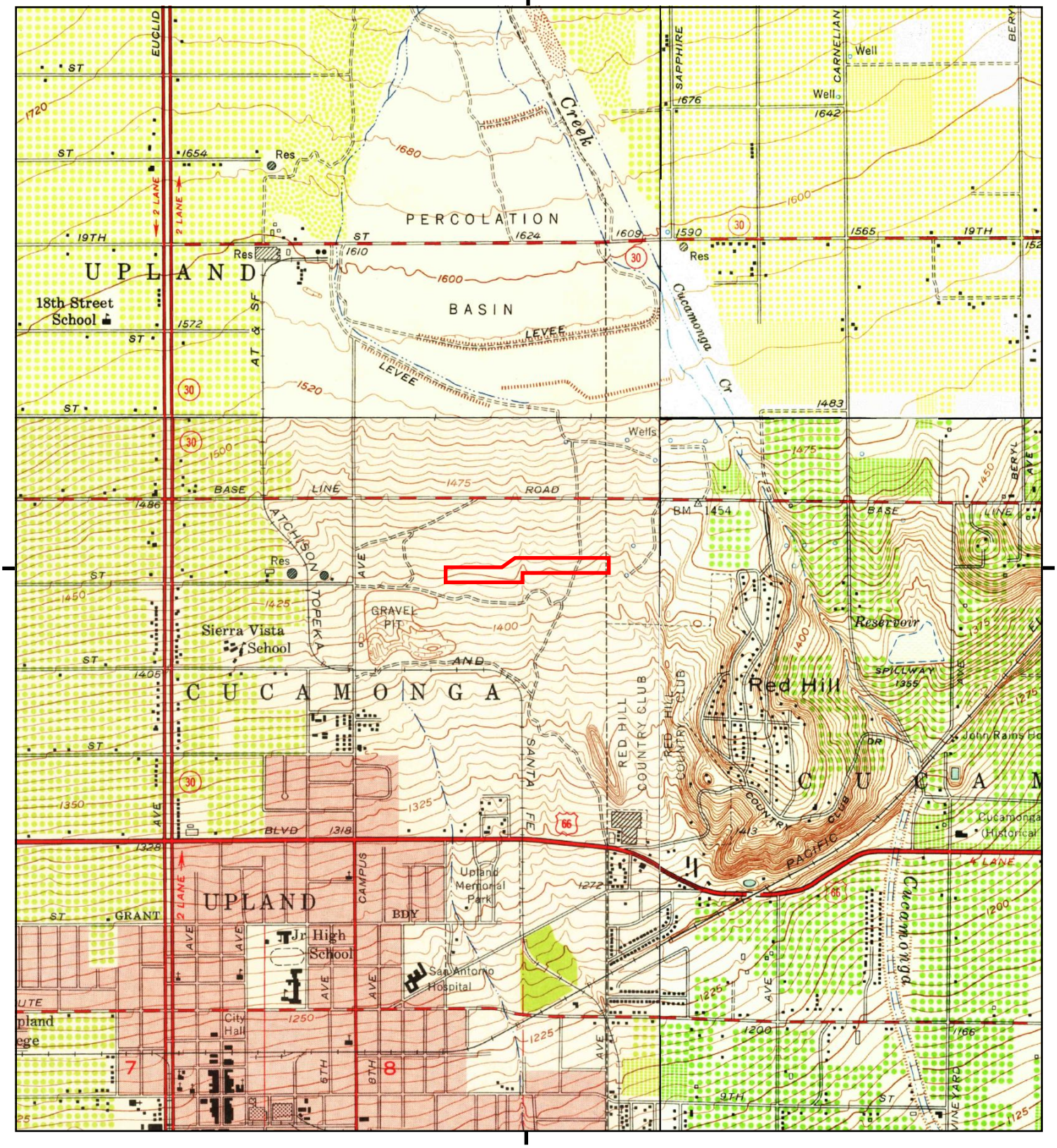
TP, Ontario, 1954, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1953, 1954




This report includes information from the following map sheet(s).

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NW N NE
W E
SW S SE

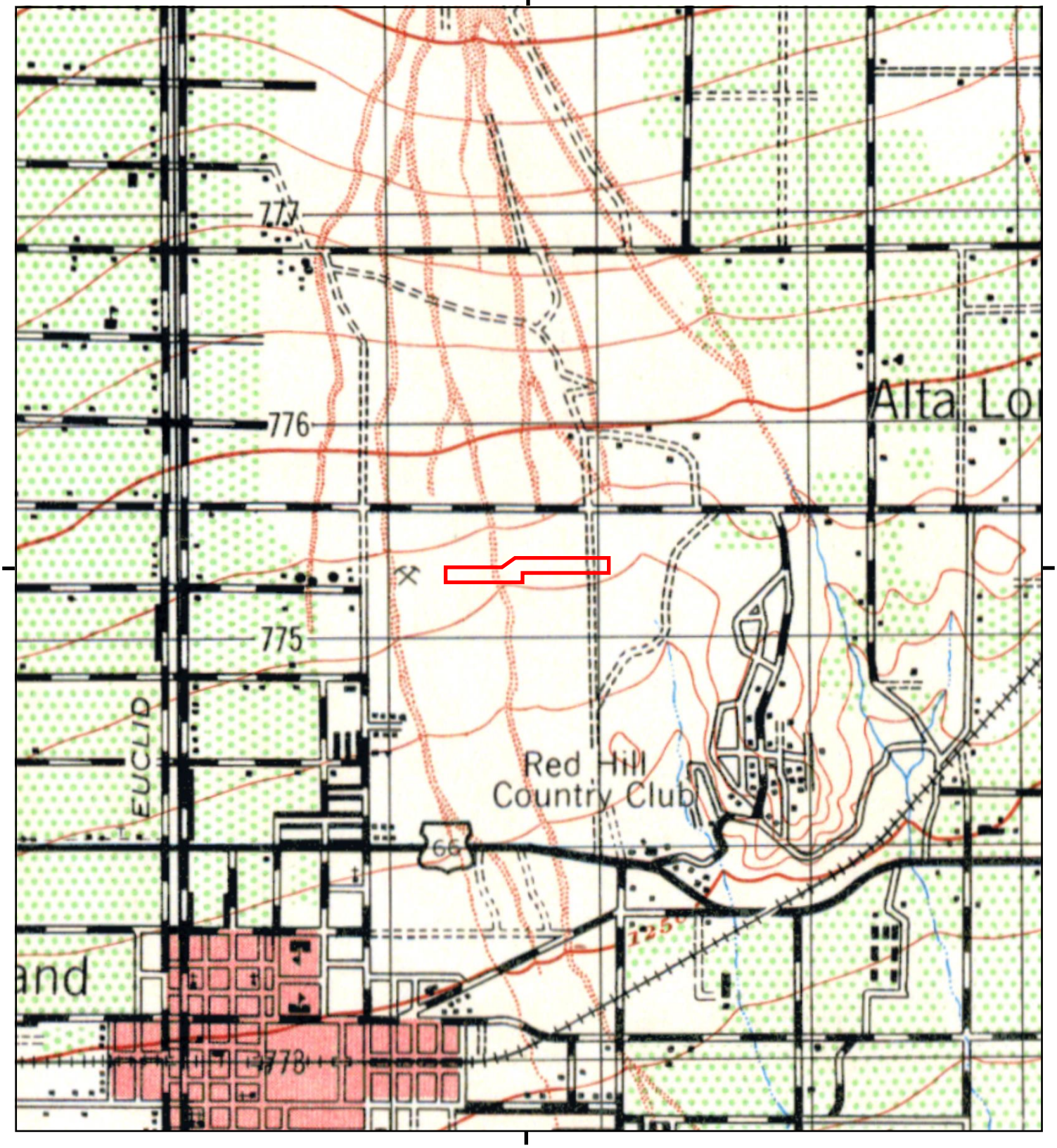
TP, Ontario, 1954, 7.5-minute
NE, Cucamonga Peak, 1953, 7.5-minute
SE, Guasti, 1953, 7.5-minute
NW, Mt. Baldy, 1954, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1944




This report includes information from the following map sheet(s).

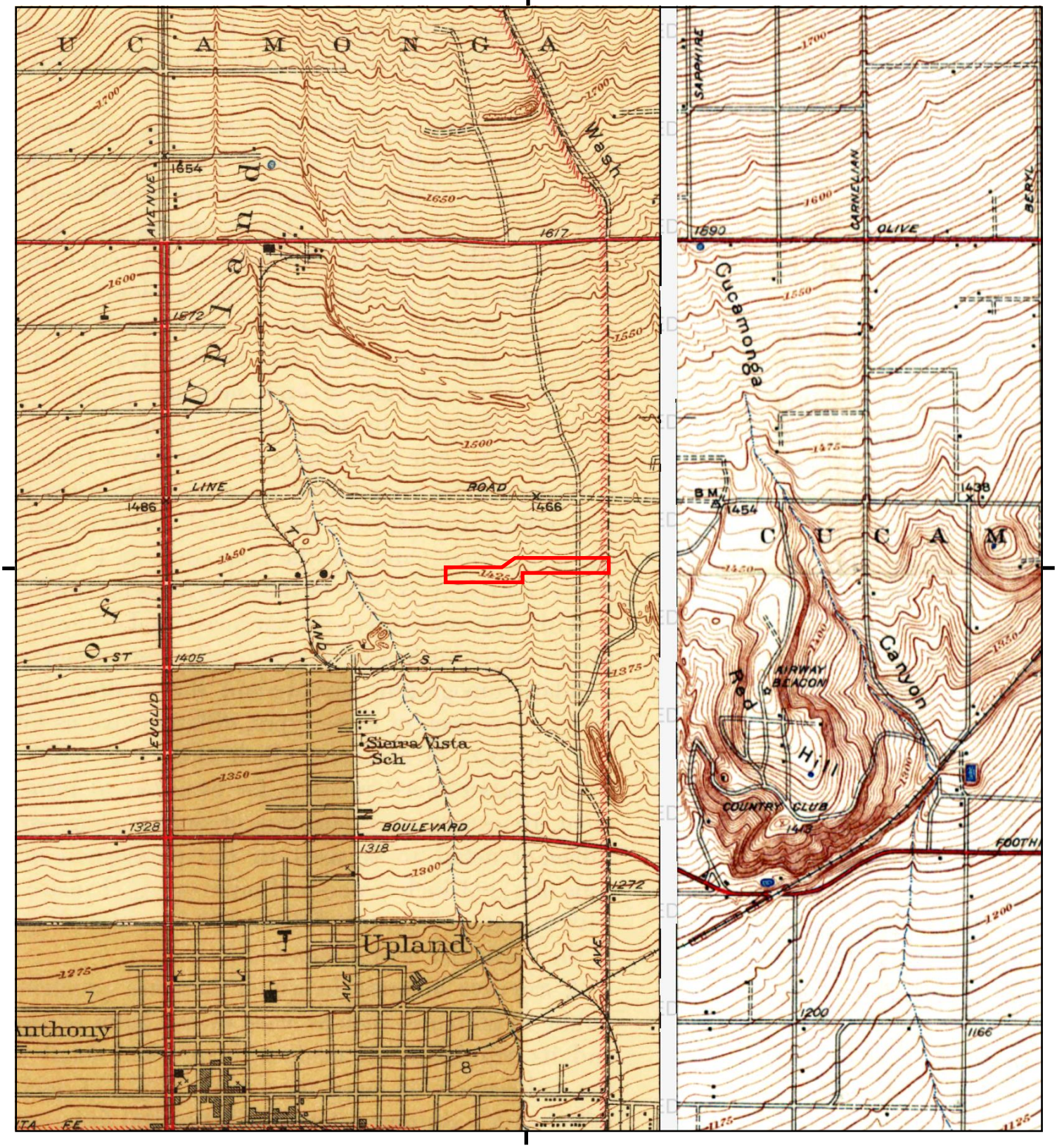
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, CUCAMONGA, 1944, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

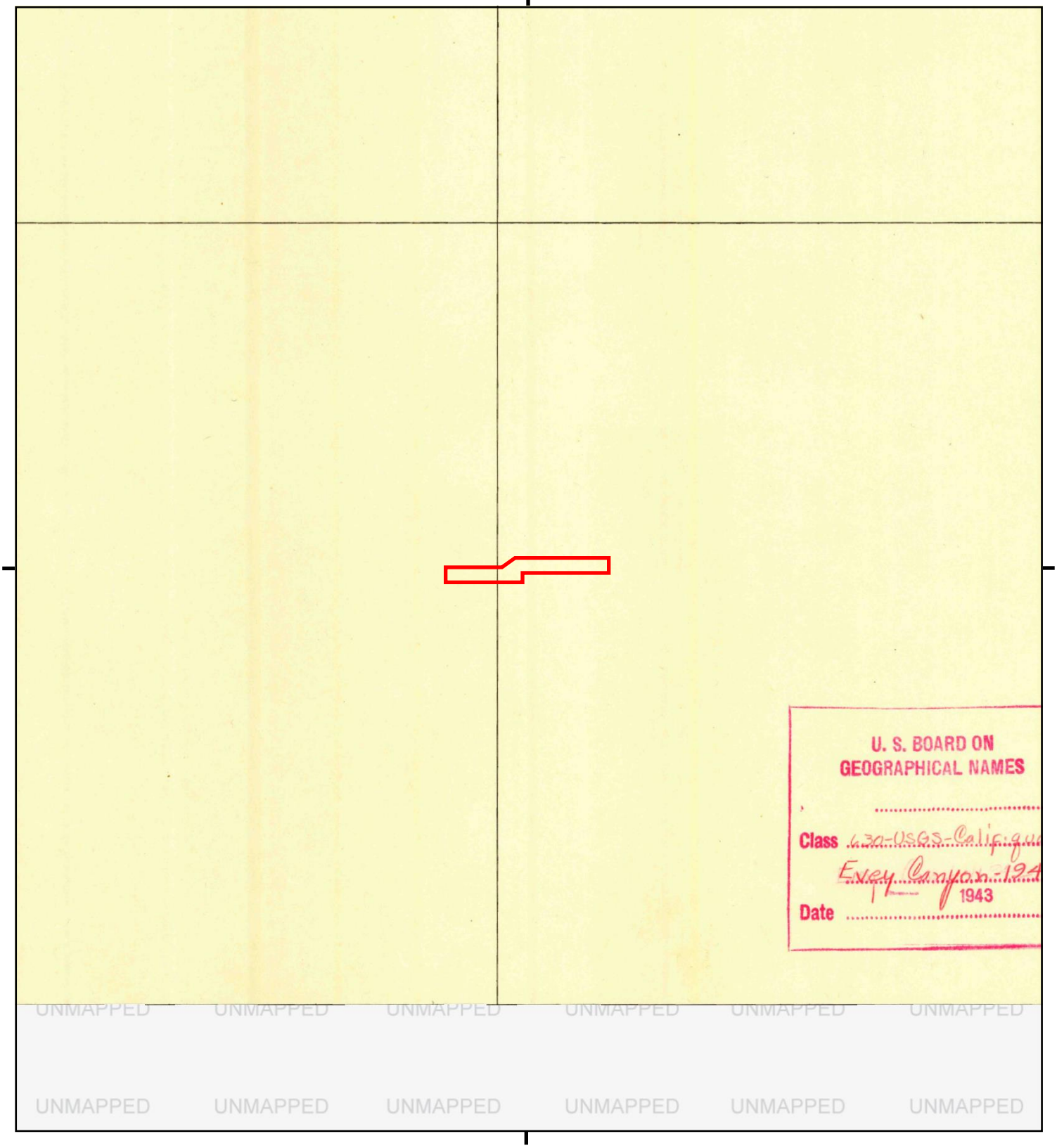
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Ontario and Vicinity, 1942, 7.5-minute
E, GUASTI VICINITY, 1941, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

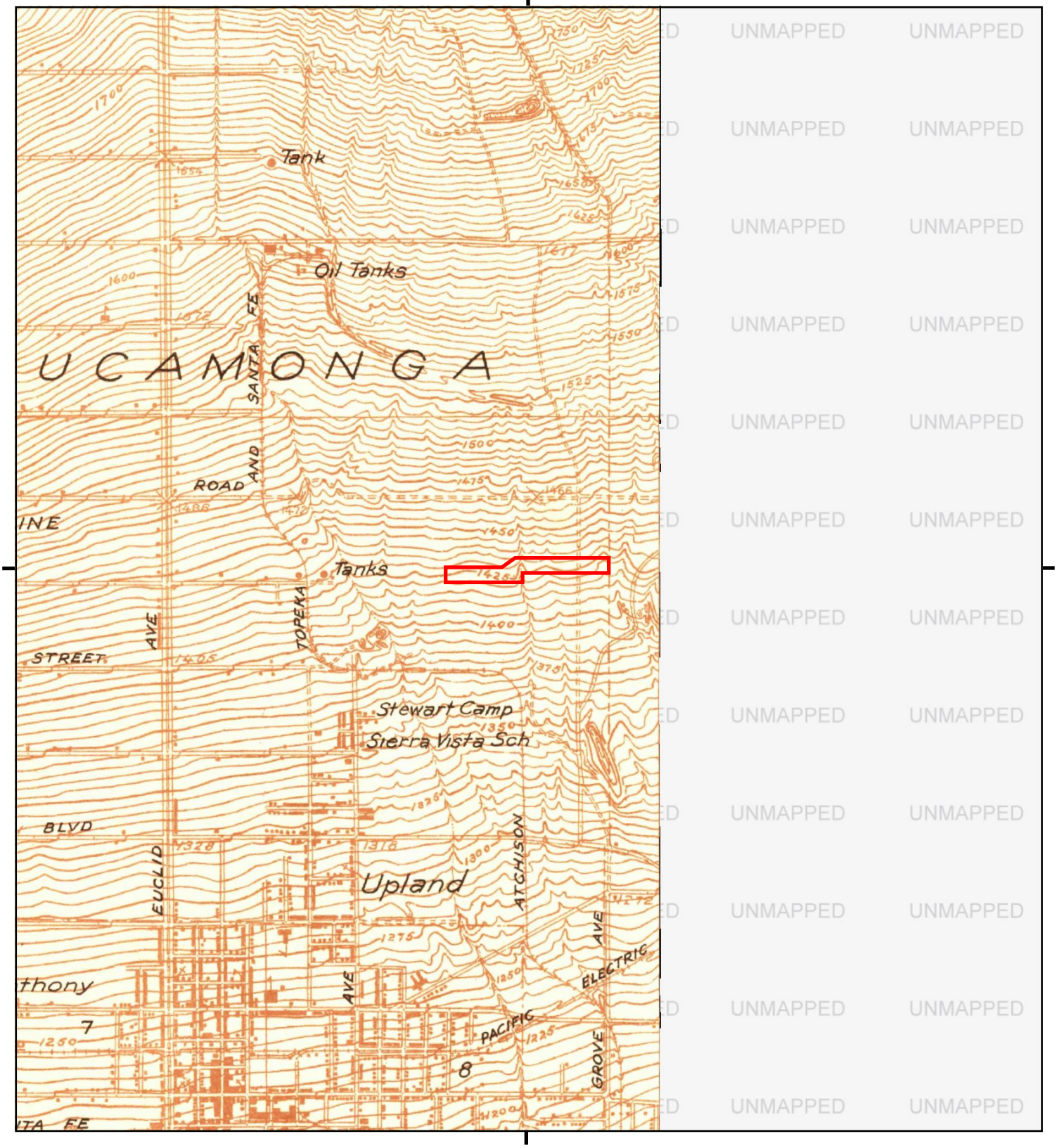
TP, Evey Canyon, 1940, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

# Historical Topo Map

1933




This report includes information from the following map sheet(s).

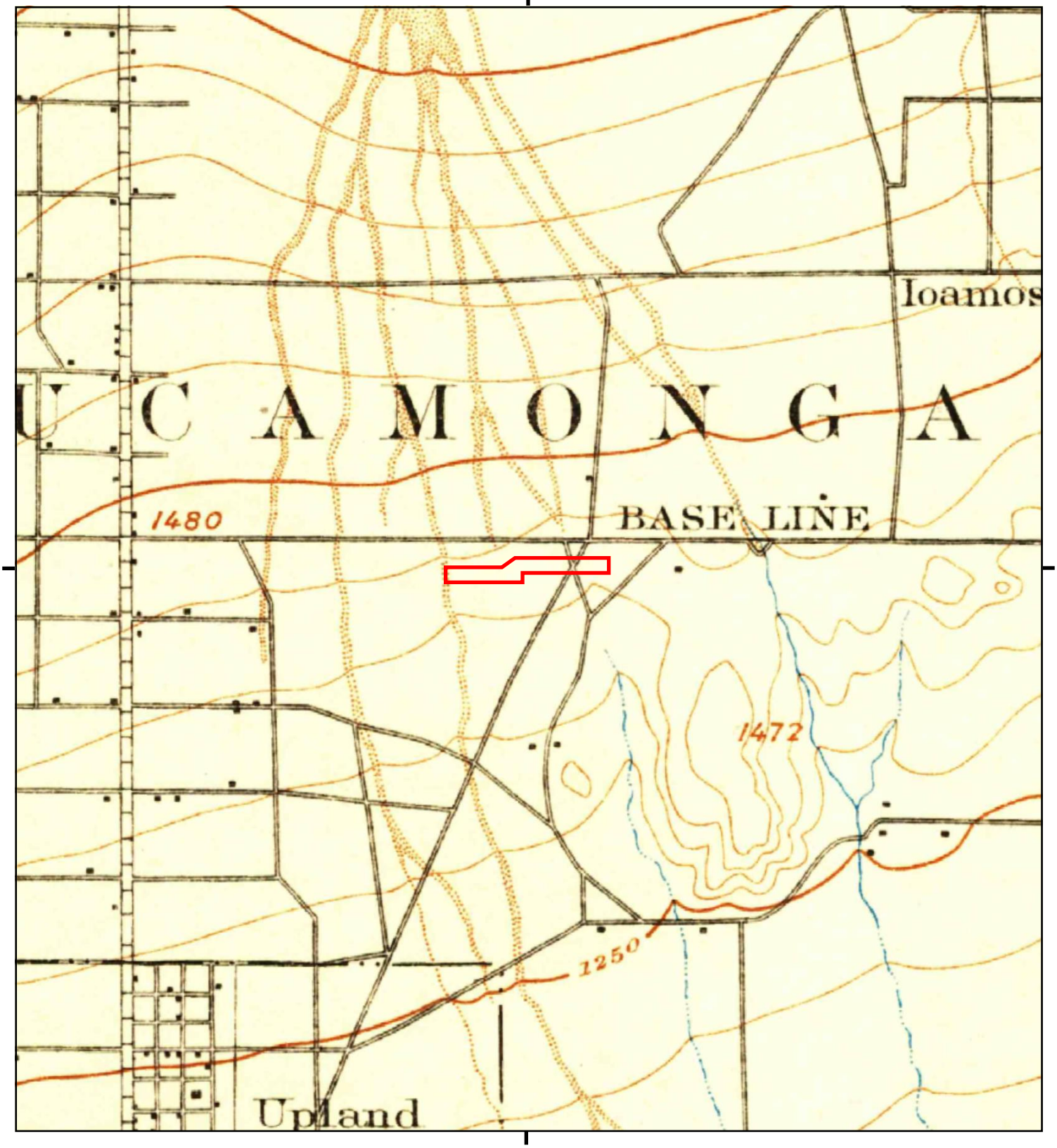
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Ontario, 1933, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

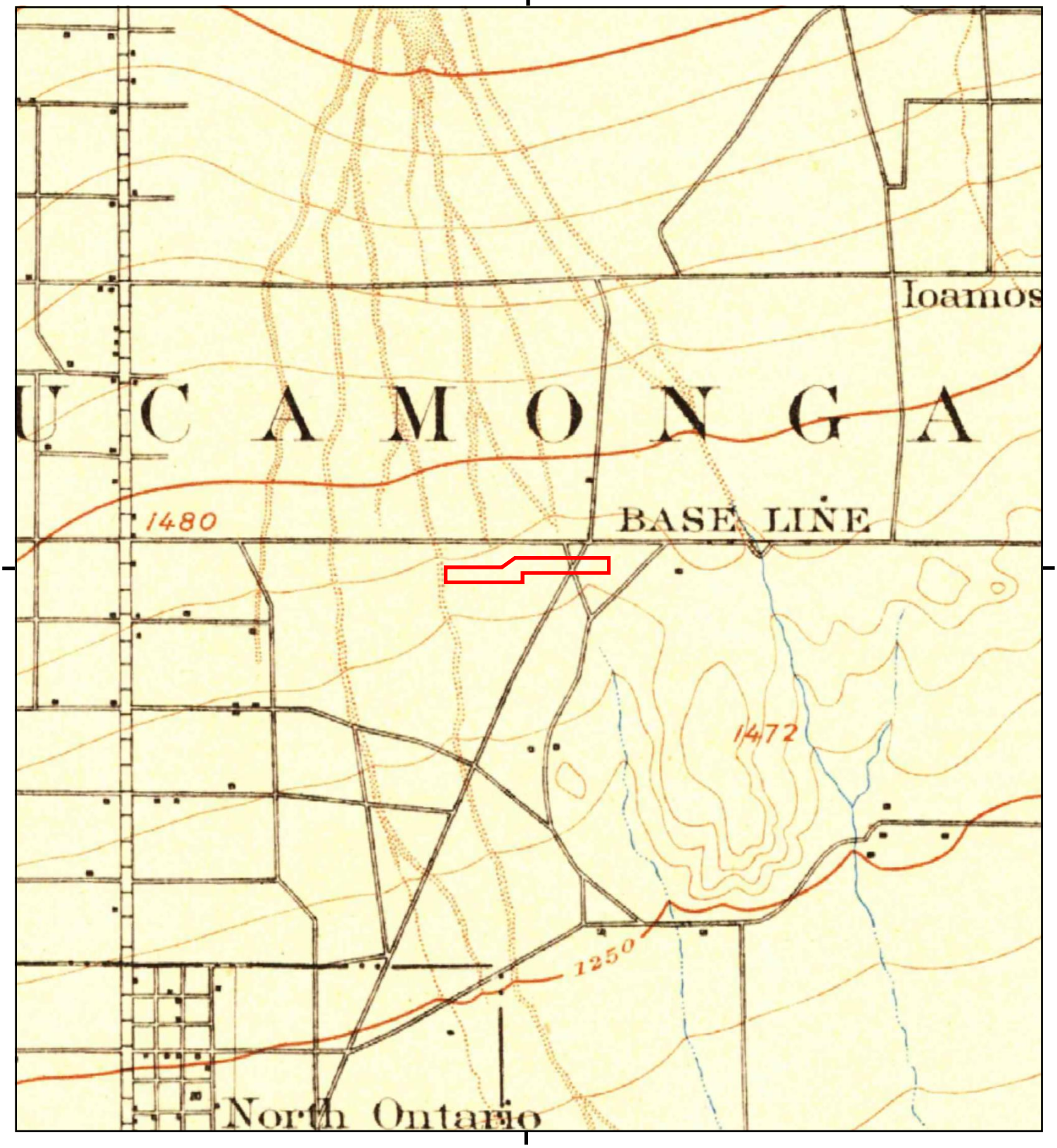
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Cucamonga, 1903, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

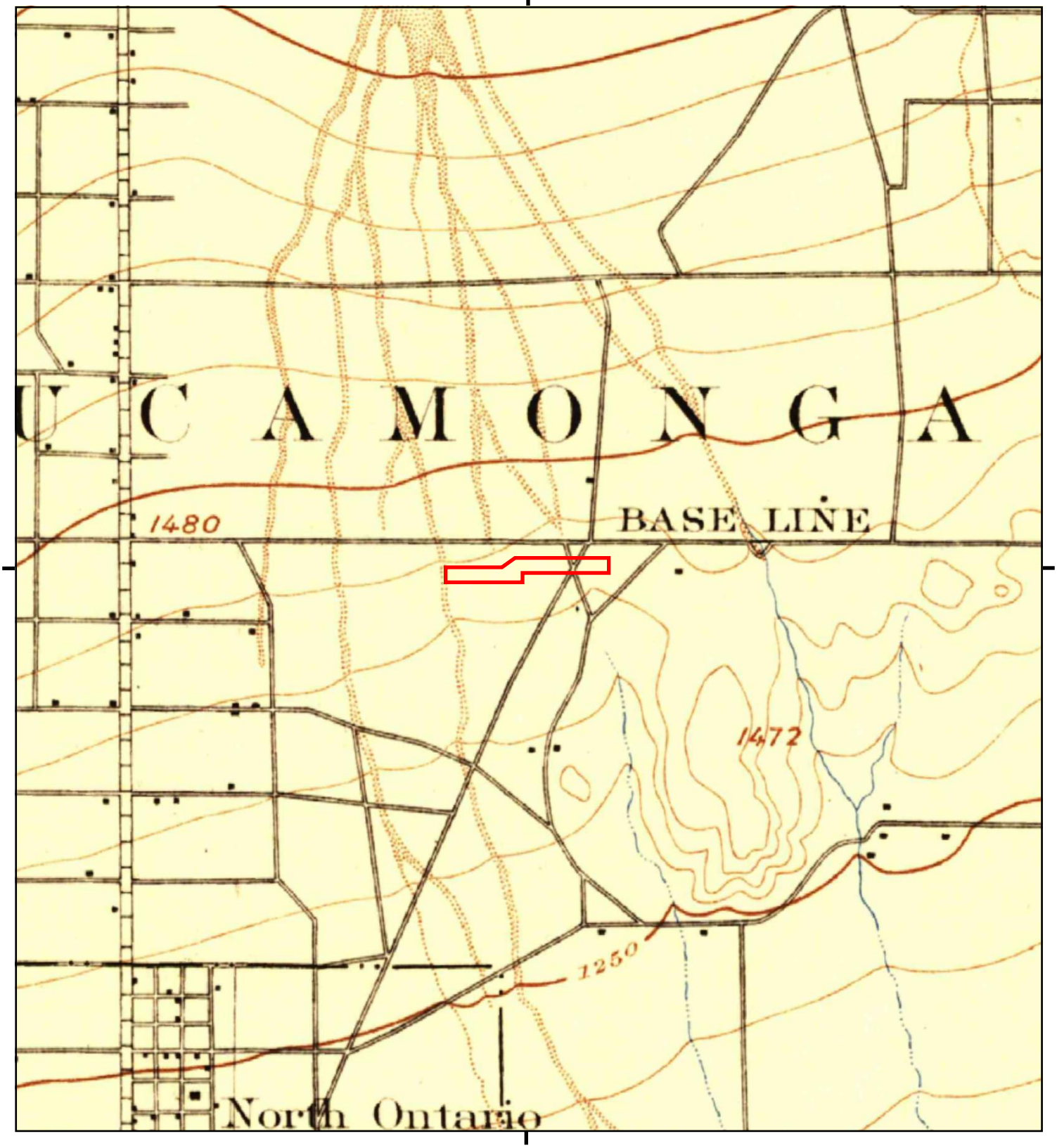
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Cucamonga, 1900, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N




This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Cucamonga, 1897, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

**Upland Site**
East 15th Street/North 13th Avenue
Upland, CA 91786

Inquiry Number: 5331724.2s
June 21, 2018

# EDR Vapor Encroachment Screen

## Prepared using EDR's Vapor Encroachment Worksheet

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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| **Primary Map** | **2** |
| **Secondary Map** | **3** |
| **Map Findings** | **4** |
| **Record Sources and Currency** | **GR-1** |


***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by EDR. The report was designed to assist parties seeking to meet the search requirements of the ASTM Standard Practice for Assessment of Vapor Encroachment into Structures on Property Involved in Real Estate Transactions (E 2600).

| STANDARD ENVIRONMENTAL RECORDS | Default Area of Concern (Miles)* | property | 1/10 | > 1/10 |
|---|---|---|---|---|
| Federal NPL site list | 1.0 | 0 | 0 | 0 |
| Federal Delisted NPL site list | 1.0 | 0 | 0 | 0 |
| Federal CERCLIS list | 0.5 | 0 | 0 | 0 |
| Federal CERCLIS NFRAP site list | 0.5 | 0 | 0 | 0 |
| Federal RCRA CORRACTS facilities list | 1.0 | 0 | 0 | 0 |
| Federal RCRA non-CORRACTS TSD facilities list | 0.5 | 0 | 0 | 0 |
| Federal RCRA generators list | 0.25 | 0 | 0 | 0 |
| Federal institutional controls / engineering controls registries | 0.5 | 0 | 0 | 0 |
| Federal ERNS list | 0.001 | 0 | 0 | - |
| State- and tribal - equivalent NPL | 1.0 | 0 | 0 | 0 |
| State- and tribal - equivalent CERCLIS | 1.0 | 0 | 0 | 0 |
| State and tribal landfill and/or solid waste disposal site lists | 0.5 | 0 | 0 | 0 |
| State and tribal leaking storage tank lists | 0.5 | 0 | 0 | 2 |
| State and tribal registered storage tank lists | 0.25 | 0 | 0 | 0 |
| State and tribal institutional control / engineering control registries | not searched | - | - | - |
| State and tribal voluntary cleanup sites | 0.5 | 0 | 0 | 0 |
| State and tribal Brownfields sites | 0.5 | 0 | 0 | 0 |

| ADDITIONAL ENVIRONMENTAL RECORDS | | | | |
|---|---|---|---|---|
| Local Brownfield lists | 0.5 | 0 | 0 | 0 |
| Local Lists of Landfill / Solid Waste Disposal Sites | 0.5 | 0 | 0 | 0 |
| Local Lists of Hazardous waste / Contaminated Sites | 1.0 | 0 | 0 | 0 |
| Local Lists of Registered Storage Tanks | 0.25 | 0 | 0 | 1 |
| Local Land Records | 0.5 | 0 | 0 | 0 |
| Records of Emergency Release Reports | 0.5 | 0 | 0 | 0 |
| Other Ascertainable Records | 1.0 | 0 | 1 | 1 |

| EDR HIGH RISK HISTORICAL RECORDS | | | | |
|---|---|---|---|---|
| EDR Exclusive Records | 1.0 | 0 | 0 | 0 |
| Exclusive Recovered Govt. Archives | 0.001 | 0 | 0 | - |

# EXECUTIVE SUMMARY

**EDR RECOVERED GOVERNMENT ARCHIVES**

| | | | | |
|---|---|---|---|---|
| EDR Exclusive Records | 1.0 | 0 | 0 | 0 |
| Exclusive Recovered Govt. Archives | 0.001 | 0 | 0 | - |

*The Default Area of Concern may be adjusted by the environmental professional using experience and professional judgement. Each category may include several databases, and each database may have a different distance. A list of individual databases is provided at the back of this report.

# EXECUTIVE SUMMARY

## TARGET PROPERTY INFORMATION

### ADDRESS

UPLAND SITE
EAST 15TH STREET/NORTH 13TH AVENUE
UPLAND, CA 91786

### COORDINATES

| | |
|---|---|
| Latitude (North): | 34.118806 - 34° 7′ 7.697754″ |
| Longitude (West): | 117.632694 - 117° 37′ 57.685547″ |
| Elevation: | 1430 ft. above sea level |

# EXECUTIVE SUMMARY

## SEARCH RESULTS

Unmappable (orphan) sites are not considered in the foregoing analysis.

## STANDARD ENVIRONMENTAL RECORDS

| Name | Address | Dist/Dir | Map ID | Page |
|---|---|---|---|---|
| UPLAND HILLS COUNTRY CLUB<br>LUST: LUST | 1231 16TH ST | 1/10 - 1/3 N | ▲ A2 | 8 |
| UPLAND HILLS COUNTRY CLUB<br>LUST: LUST<br>San Bern. Co. Permit: San Bern. Co. Permit<br>HIST UST: HIST UST | 1231 E 16TH ST | 1/10 - 1/3 N | ▲ A3 | 8 |

## ADDITIONAL ENVIRONMENTAL RECORDS

| Name | Address | Dist/Dir | Map ID | Page |
|---|---|---|---|---|
| IEUA GROUNDWATER RECHARGE BASIN OPERATIONS AND MAINTENANCE<br>CIWQS: CIWQS | Not Reported | <1/10 W | ◆ 1 | 8 |
| UPLAND HILLS COUNTRY CLUB<br>LUST: LUST<br>San Bern. Co. Permit: San Bern. Co. Permit<br>HIST UST: HIST UST | 1231 E 16TH ST | 1/10 - 1/3 N | ▲ A3 | 8 |

## EDR HIGH RISK HISTORICAL RECORDS

| Name | Address | Dist/Dir | Map ID | Page |
|---|---|---|---|---|
| Not Reported | | | | |

## EDR RECOVERED GOVERNMENT ARCHIVES

| Name | Address | Dist/Dir | Map ID | Page |
|---|---|---|---|---|
| Not Reported | | | | |

# PRIMARY MAP - 5331724.2S




0 300 1/3 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Upland Site<br>ADDRESS: East 15th Street/North 13th Avenue<br>Upland CA 91786<br>LAT/LONG: 34.118806 / 117.632694 | CLIENT: Geotek<br>CONTACT: Anna M. Scott<br>INQUIRY #: 5331724.2s<br>DATE: June 14, 2018 12:49 pm |

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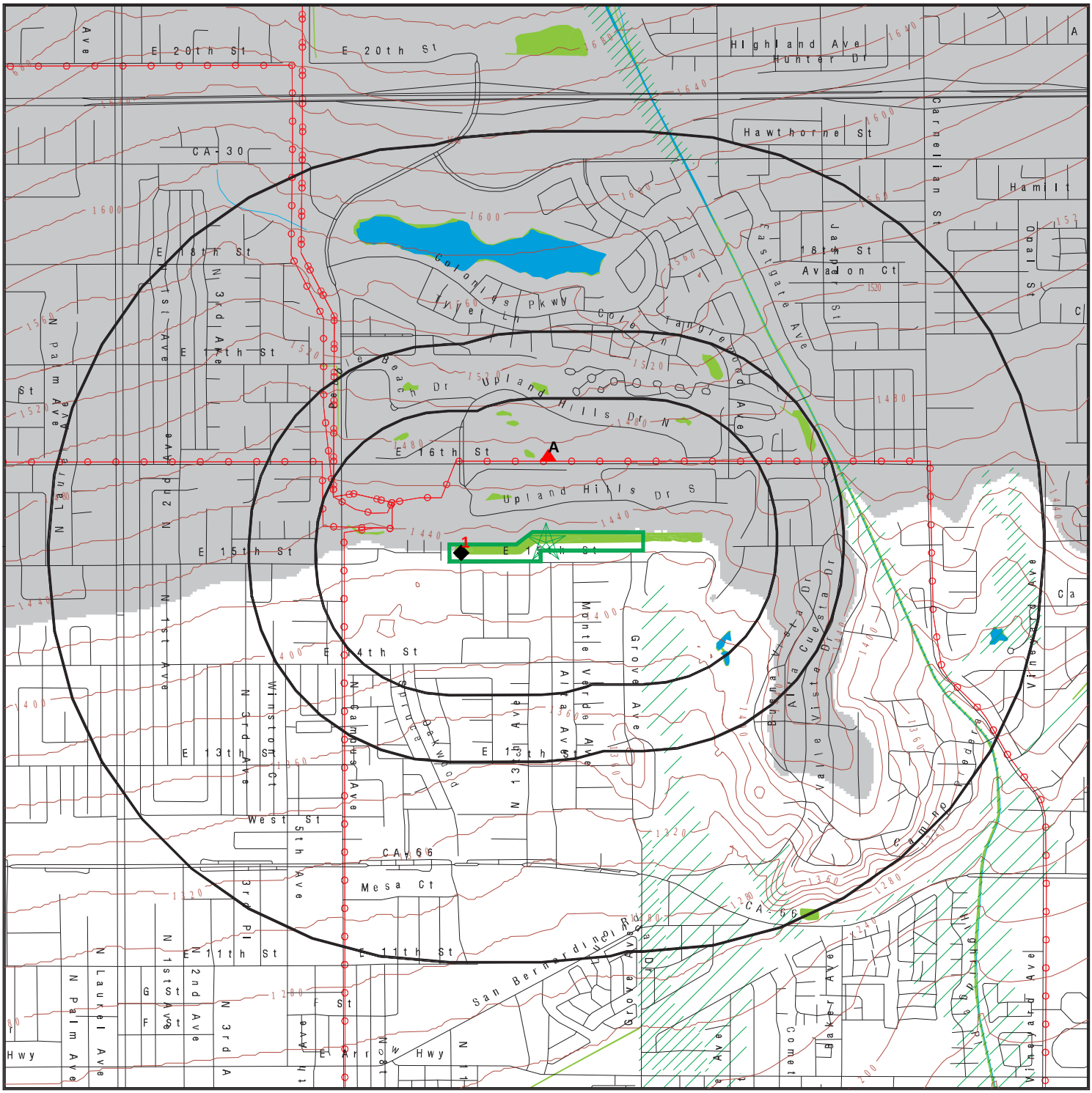
# SECONDARY MAP - 5331724.2S




Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/3 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

Upgradient Area

Areas of Concern

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Upland Site | CLIENT: Geotek |
| ADDRESS: East 15th Street/North 13th Avenue<br>Upland CA 91786 | CONTACT: Anna M. Scott<br>INQUIRY #: 5331724.2s |
| LAT/LONG: 34.118806 / 117.632694 | DATE: June 14, 2018 12:46 pm |

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MAP FINDINGS

**LEGEND**

| **FACILITY NAME**<br>**FACILITY ADDRESS, CITY, ST, ZIP** | | EDR SITE ID NUMBER |
|---|---|---|
| ◆ **MAP ID#** | Direction Distance Range (Distance feet / miles)<br>Relative Elevation Feet Above Sea Level | ASTM 2600 Record Sources found in this report. Each database searched has been assigned to one or more categories. For detailed information about categorization, see the section of the report Records Searched and Currency. |

**Worksheet:**

**Comments:**
Comments may be added on the online Vapor Encroachment Worksheet.

DATABASE ACRONYM: Applicable categories (A hoverbox with database description).

| IEUA GROUNDWATER RECHARGE BASIN OPERATIONS AND MAINTENANCE<br>Not Reported, UPLAND, CA, 91786 | | | S121645815 |
|---|---|---|---|
| ◆ 1 | W <1/10 | (0 ft. / 0 mi.) | Other Ascertainable Records |
| | 1 ft. Lower Elevation | 1429 ft. Above Sea Level | |

**Worksheet:**

| UPLAND HILLS COUNTRY CLUB<br>1231 16TH ST, UPLAND, CA, 95047 | | | S102440451 |
|---|---|---|---|
| ▲ A2 | N 1/10 - 1/3 | (984 ft. / 0.186 mi.) | State and tribal leaking storage tank lists |
| | 42 ft. Higher Elevation | 1472 ft. Above Sea Level | |

**Worksheet:**

| UPLAND HILLS COUNTRY CLUB<br>1231 E 16TH ST, UPLAND, CA, 95047 | | | U001570727 |
|---|---|---|---|
| ▲ A3 | N 1/10 - 1/3 | (984 ft. / 0.186 mi.) | State and tribal leaking storage tank lists<br>Local Lists of Registered Storage Tanks |
| | 42 ft. Higher Elevation | 1472 ft. Above Sea Level | Other Ascertainable Records |

**Worksheet:**

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| **ENVIRONMENTAL RECORDS** | | | | | | |
| ***Federal NPL site list*** | | | | | | |
| US | NPL | National Priority List | EPA | 12/11/2017 | 12/22/2017 | 01/05/2018 |
| US | Proposed NPL | Proposed National Priority List Sites | EPA | 12/11/2017 | 12/22/2017 | 01/05/2018 |
| US | NPL LIENS | Federal Superfund Liens | EPA | 10/15/1991 | 02/02/1994 | 03/30/1994 |
| ***Federal CERCLIS list*** | | | | | | |
| US | SEMS | Superfund Enterprise Management System | EPA | 01/09/2018 | 02/06/2018 | 04/13/2018 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | |
| US | CORRACTS | Corrective Action Report | EPA | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| ***Federal RCRA TSD facilities list*** | | | | | | |
| US | RCRA-TSDF | RCRA - Treatment, Storage and Disposal | Environmental Protection Agency | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| ***Federal RCRA generators list*** | | | | | | |
| US | RCRA-LQG | RCRA - Large Quantity Generators | Environmental Protection Agency | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| US | RCRA-SQG | RCRA - Small Quantity Generators | Environmental Protection Agency | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| US | RCRA-CESQG | RCRA - Conditionally Exempt Small Quantity Generators | Environmental Protection Agency | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | |
| US | LUCIS | Land Use Control Information System | Department of the Navy | 02/16/2018 | 02/22/2018 | 05/11/2018 |
| US | US ENG CONTROLS | Engineering Controls Sites List | Environmental Protection Agency | 02/13/2018 | 02/27/2018 | 05/11/2018 |
| US | US INST CONTROL | Sites with Institutional Controls | Environmental Protection Agency | 02/13/2018 | 02/27/2018 | 05/11/2018 |
| ***Federal ERNS list*** | | | | | | |
| US | ERNS | Emergency Response Notification System | National Response Center, United States Coast | 03/19/2018 | 03/27/2018 | 06/08/2018 |
| ***State and tribal - equivalent NPL*** | | | | | | |
| CA | RESPONSE | State Response Sites | Department of Toxic Substances Control | 01/30/2018 | 01/31/2018 | 03/19/2018 |
| ***State and tribal - equivalent CERCLIS*** | | | | | | |
| CA | ENVIROSTOR | EnviroStor Database | Department of Toxic Substances Control | 01/30/2018 | 01/31/2018 | 03/19/2018 |
| ***State and tribal landfill / solid waste disposal*** | | | | | | |
| CA | SWF/LF (SWIS) | Solid Waste Information System | Department of Resources Recycling and Recover | 02/12/2018 | 02/14/2018 | 04/03/2018 |
| ***State and tribal leaking storage tank lists*** | | | | | | |
| CA | LUST REG 1 | Active Toxic Site Investigation | California Regional Water Quality Control Boa | 02/01/2001 | 02/28/2001 | 03/29/2001 |
| CA | LUST REG 7 | Leaking Underground Storage Tank Case Listing | California Regional Water Quality Control Boa | 02/26/2004 | 02/26/2004 | 03/24/2004 |
| CA | LUST REG 8 | Leaking Underground Storage Tanks | California Regional Water Quality Control Boa | 02/14/2005 | 02/15/2005 | 03/28/2005 |
| CA | LUST | Leaking Underground Fuel Tank Report (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 03/21/2018 |
| CA | LUST REG 6V | Leaking Underground Storage Tank Case Listing | California Regional Water Quality Control Boa | 06/07/2005 | 06/07/2005 | 06/29/2005 |
| CA | LUST REG 6L | Leaking Underground Storage Tank Case Listing | California Regional Water Quality Control Boa | 09/09/2003 | 09/10/2003 | 10/07/2003 |
| CA | LUST REG 5 | Leaking Underground Storage Tank Database | California Regional Water Quality Control Boa | 07/01/2008 | 07/22/2008 | 07/31/2008 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| CA | LUST REG 2 | Fuel Leak List | California Regional Water Quality Control Boa | 09/30/2004 | 10/20/2004 | 11/19/2004 |
| CA | LUST REG 3 | Leaking Underground Storage Tank Database | California Regional Water Quality Control Boa | 05/19/2003 | 05/19/2003 | 06/02/2003 |
| CA | LUST REG 4 | Underground Storage Tank Leak List | California Regional Water Quality Control Boa | 09/07/2004 | 09/07/2004 | 10/12/2004 |
| CA | LUST REG 9 | Leaking Underground Storage Tank Report | California Regional Water Quality Control Boa | 03/01/2001 | 04/23/2001 | 05/21/2001 |
| US | INDIAN LUST R10 | Leaking Underground Storage Tanks on Indian Land | EPA Region 10 | 10/24/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R9 | Leaking Underground Storage Tanks on Indian Land | Environmental Protection Agency | 09/30/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R8 | Leaking Underground Storage Tanks on Indian Land | EPA Region 8 | 10/12/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R7 | Leaking Underground Storage Tanks on Indian Land | EPA Region 7 | 10/12/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R6 | Leaking Underground Storage Tanks on Indian Land | EPA Region 6 | 01/06/2018 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R4 | Leaking Underground Storage Tanks on Indian Land | EPA Region 4 | 10/14/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R1 | Leaking Underground Storage Tanks on Indian Land | EPA Region 1 | 10/14/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN LUST R5 | Leaking Underground Storage Tanks on Indian Land | EPA, Region 5 | 10/16/2017 | 01/23/2018 | 04/13/2018 |
| CA | CPS-SLIC | Statewide SLIC Cases (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 03/21/2018 |
| CA | SLIC REG 1 | Active Toxic Site Investigations | California Regional Water Quality Control Boa | 04/03/2003 | 04/07/2003 | 04/25/2003 |
| CA | SLIC REG 2 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | Regional Water Quality Control Board San Fran | 09/30/2004 | 10/20/2004 | 11/19/2004 |
| CA | SLIC REG 3 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | California Regional Water Quality Control Boa | 05/18/2006 | 05/18/2006 | 06/15/2006 |
| CA | SLIC REG 4 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | Region Water Quality Control Board Los Angele | 11/17/2004 | 11/18/2004 | 01/04/2005 |
| CA | SLIC REG 5 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | Regional Water Quality Control Board Central | 04/01/2005 | 04/05/2005 | 04/21/2005 |
| CA | SLIC REG 6V | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | Regional Water Quality Control Board, Victorv | 05/24/2005 | 05/25/2005 | 06/16/2005 |
| CA | SLIC REG 6L | SLIC Sites | California Regional Water Quality Control Boa | 09/07/2004 | 09/07/2004 | 10/12/2004 |
| CA | SLIC REG 7 | SLIC List | California Regional Quality Control Board, Co | 11/24/2004 | 11/29/2004 | 01/04/2005 |
| CA | SLIC REG 8 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | California Region Water Quality Control Board | 04/03/2008 | 04/03/2008 | 04/14/2008 |
| CA | SLIC REG 9 | Spills, Leaks, Investigation & Cleanup Cost Recovery Listing | California Regional Water Quality Control Boa | 09/10/2007 | 09/11/2007 | 09/28/2007 |
| ***State and tribal registered storage tank lists*** | | | | | | |
| CA | UST | Active UST Facilities | SWRCB | 03/12/2018 | 03/14/2018 | 03/29/2018 |
| CA | UST CLOSURE | Proposed Closure of Underground Storage Tank (UST) Cases | State Water Resources Control Board | 03/08/2018 | 03/14/2018 | 05/04/2018 |
| CA | MILITARY UST SITES | Military UST Sites (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | UST MENDOCINO | Mendocino County UST Database | Department of Public Health | 02/28/2018 | 03/01/2018 | 03/28/2018 |
| CA | AST | Aboveground Petroleum Storage Tank Facilities | California Environmental Protection Agency | 07/06/2016 | 07/12/2016 | 09/19/2016 |
| US | INDIAN UST R9 | Underground Storage Tanks on Indian Land | EPA Region 9 | 09/30/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R8 | Underground Storage Tanks on Indian Land | EPA Region 8 | 10/12/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R7 | Underground Storage Tanks on Indian Land | EPA Region 7 | 01/13/2018 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R6 | Underground Storage Tanks on Indian Land | EPA Region 6 | 04/24/2017 | 07/27/2017 | 12/08/2017 |
| US | INDIAN UST R1 | Underground Storage Tanks on Indian Land | EPA, Region 1 | 10/14/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R4 | Underground Storage Tanks on Indian Land | EPA Region 4 | 10/14/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R5 | Underground Storage Tanks on Indian Land | EPA Region 5 | 10/16/2017 | 01/23/2018 | 04/13/2018 |
| US | INDIAN UST R10 | Underground Storage Tanks on Indian Land | EPA Region 10 | 10/24/2017 | 01/23/2018 | 04/13/2018 |
| US | FEMA UST | Underground Storage Tank Listing | FEMA | 05/15/2017 | 05/30/2017 | 10/13/2017 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| ***State and tribal voluntary cleanup sites*** | | | | | | |
| US | INDIAN VCP R7 | Voluntary Cleanup Priority Lisitng | EPA, Region 7 | 03/20/2008 | 04/22/2008 | 05/19/2008 |
| US | INDIAN VCP R1 | Voluntary Cleanup Priority Listing | EPA, Region 1 | 07/27/2015 | 09/29/2015 | 02/18/2016 |
| CA | VCP | Voluntary Cleanup Program Properties | Department of Toxic Substances Control | 01/30/2018 | 01/31/2018 | 03/19/2018 |
| ***State and tribal Brownfields sites*** | | | | | | |
| CA | BROWNFIELDS | Considered Brownfieds Sites Listing | State Water Resources Control Board | 03/26/2018 | 03/27/2018 | 05/04/2018 |
| ***Other Records*** | | | | | | |
| US | CONSENT | Superfund (CERCLA) Consent Decrees | Department of Justice, Consent Decree Library | 12/31/2017 | 01/24/2018 | 04/13/2018 |
| US | ROD | Records Of Decision | EPA | 01/09/2018 | 02/06/2018 | 05/11/2018 |
| US | LIENS 2 | CERCLA Lien Information | Environmental Protection Agency | 01/09/2018 | 02/06/2018 | 05/11/2018 |
| CA | HIST CAL-SITES | Calsites Database | Department of Toxic Substance Control | 08/08/2005 | 08/03/2006 | 08/24/2006 |
| US | DEBRIS REGION 9 | Torres Martinez Reservation Illegal Dump Site Locations | EPA, Region 9 | 01/12/2009 | 05/07/2009 | 09/21/2009 |
| CA | SWRCY | Recycler Database | Department of Conservation | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | CA FID UST | Facility Inventory Database | California Environmental Protection Agency | 10/31/1994 | 09/05/1995 | 09/29/1995 |
| CA | HIST UST | Hazardous Substance Storage Container Database | State Water Resources Control Board | 10/15/1990 | 01/25/1991 | 02/12/1991 |
| CA | SAN FRANCISCO AST | Aboveground Storage Tank Site Listing | San Francisco County Department of Public Hea | 04/19/2018 | 04/24/2018 | 05/04/2018 |
| CA | SWEEPS UST | SWEEPS UST Listing | State Water Resources Control Board | 06/01/1994 | 07/07/2005 | 08/11/2005 |
| US | SCRD DRYCLEANERS | State Coalition for Remediation of Drycleaners Listing | Environmental Protection Agency | 01/01/2017 | 02/03/2017 | 04/07/2017 |
| US | COAL ASH EPA | Coal Combustion Residues Surface Impoundments List | Environmental Protection Agency | 07/01/2014 | 09/10/2014 | 10/20/2014 |
| US | COAL ASH DOE | Steam-Electric Plant Operation Data | Department of Energy | 12/31/2005 | 08/07/2009 | 10/22/2009 |
| US | US AIRS (AFS) | Aerometric Information Retrieval System Facility Subsystem ( | EPA | 10/12/2016 | 10/26/2016 | 02/03/2017 |
| US | US AIRS MINOR | Air Facility System Data | EPA | 10/12/2016 | 10/26/2016 | 02/03/2017 |
| US | US FIN ASSUR | Financial Assurance Information | Environmental Protection Agency | 01/11/2018 | 01/19/2018 | 03/02/2018 |
| US | EPA WATCH LIST | EPA WATCH LIST | Environmental Protection Agency | 08/30/2013 | 03/21/2014 | 06/17/2014 |
| US | FUSRAP | Formerly Utilized Sites Remedial Action Program | Department of Energy | 12/23/2016 | 12/27/2016 | 02/17/2017 |
| US | PCB TRANSFORMER | PCB Transformer Registration Database | Environmental Protection Agency | 05/24/2017 | 11/30/2017 | 12/15/2017 |
| US | 2020 COR ACTION | 2020 Corrective Action Program List | Environmental Protection Agency | 04/22/2013 | 03/03/2015 | 03/09/2015 |
| US | LEAD SMELTER 1 | Lead Smelter Sites | Environmental Protection Agency | 01/09/2018 | 02/06/2018 | 03/02/2018 |
| US | LEAD SMELTER 2 | Lead Smelter Sites | American Journal of Public Health | 04/05/2001 | 10/27/2010 | 12/02/2010 |
| US | US HIST CDL | National Clandestine Laboratory Register | Drug Enforcement Administration | 02/22/2018 | 03/01/2018 | 05/11/2018 |
| US | Delisted NPL | National Priority List Deletions | EPA | 12/11/2017 | 12/22/2017 | 01/05/2018 |
| US | SEMS-ARCHIVE | Superfund Enterprise Management System Archive | EPA | 01/09/2018 | 02/06/2018 | 04/13/2018 |
| US | RCRA NonGen / NLR | RCRA - Non Generators / No Longer Regulated | Environmental Protection Agency | 12/11/2017 | 12/26/2017 | 02/09/2018 |
| US | HMIRS | Hazardous Materials Information Reporting System | U.S. Department of Transportation | 03/26/2018 | 03/27/2018 | 06/08/2018 |
| US | DOT OPS | Incident and Accident Data | Department of Transporation, Office of Pipeli | 07/31/2012 | 08/07/2012 | 09/18/2012 |
| US | US CDL | Clandestine Drug Labs | Drug Enforcement Administration | 02/22/2018 | 03/01/2018 | 05/11/2018 |
| US | US BROWNFIELDS | A Listing of Brownfields Sites | Environmental Protection Agency | 03/19/2018 | 03/21/2018 | 06/08/2018 |
| US | DOD | Department of Defense Sites | USGS | 12/31/2005 | 11/10/2006 | 01/11/2007 |
| US | FEDLAND | Federal and Indian Lands | U.S. Geological Survey | 12/31/2005 | 02/06/2006 | 01/11/2007 |
| US | FUDS | Formerly Used Defense Sites | U.S. Army Corps of Engineers | 01/31/2015 | 07/08/2015 | 10/13/2015 |
| US | UMTRA | Uranium Mill Tailings Sites | Department of Energy | 06/23/2017 | 10/11/2017 | 11/03/2017 |
| US | ODI | Open Dump Inventory | Environmental Protection Agency | 06/30/1985 | 08/09/2004 | 09/17/2004 |
| US | US MINES | Mines Master Index File | Department of Labor, Mine Safety and Health A | 01/25/2018 | 02/28/2018 | 05/11/2018 |
| US | US MINES 2 | Ferrous and Nonferrous Metal Mines Database Listing | USGS | 12/05/2005 | 02/29/2008 | 04/18/2008 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| US | US MINES 3 | Active Mines & Mineral Plants Database Listing | USGS | 04/14/2011 | 06/08/2011 | 09/13/2011 |
| US | PRP | Potentially Responsible Parties | EPA | 10/25/2013 | 10/17/2014 | 10/20/2014 |
| US | TRIS | Toxic Chemical Release Inventory System | EPA | 12/31/2016 | 01/10/2018 | 01/12/2018 |
| US | TSCA | Toxic Substances Control Act | EPA | 12/31/2016 | 06/21/2017 | 01/05/2018 |
| US | FTTS | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu | EPA/Office of Prevention, Pesticides and Toxi | 04/09/2009 | 04/16/2009 | 05/11/2009 |
| US | FTTS INSP | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu | EPA | 04/09/2009 | 04/16/2009 | 05/11/2009 |
| US | HIST FTTS | FIFRA/TSCA Tracking System Administrative Case Listing | Environmental Protection Agency | 10/19/2006 | 03/01/2007 | 04/10/2007 |
| US | HIST FTTS INSP | FIFRA/TSCA Tracking System Inspection & Enforcement Case Lis | Environmental Protection Agency | 10/19/2006 | 03/01/2007 | 04/10/2007 |
| US | SSTS | Section 7 Tracking Systems | EPA | 12/31/2009 | 12/10/2010 | 02/25/2011 |
| US | ICIS | Integrated Compliance Information System | Environmental Protection Agency | 11/18/2016 | 11/23/2016 | 02/10/2017 |
| US | PADS | PCB Activity Database System | EPA | 06/01/2017 | 06/09/2017 | 10/13/2017 |
| US | MLTS | Material Licensing Tracking System | Nuclear Regulatory Commission | 08/30/2016 | 09/08/2016 | 10/21/2016 |
| US | RADINFO | Radiation Information Database | Environmental Protection Agency | 01/03/2018 | 01/04/2018 | 04/13/2018 |
| US | FINDS | Facility Index System/Facility Registry System | EPA | 02/21/2018 | 02/23/2018 | 03/23/2018 |
| US | RAATS | RCRA Administrative Action Tracking System | EPA | 04/17/1995 | 07/03/1995 | 08/07/1995 |
| US | RMP | Risk Management Plans | Environmental Protection Agency | 11/02/2017 | 11/17/2017 | 12/08/2017 |
| US | BRS | Biennial Reporting System | EPA/NTIS | 12/31/2015 | 02/22/2017 | 09/28/2017 |
| US | PWS | Public Water System Data | EPA | 12/17/2013 | 01/09/2014 | 10/15/2014 |
| US | INDIAN RESERV | Indian Reservations | USGS | 12/31/2014 | 07/14/2015 | 01/10/2017 |
| US | INDIAN ODI | Report on the Status of Open Dumps on Indian Lands | Environmental Protection Agency | 12/31/1998 | 12/03/2007 | 01/24/2008 |
| CA | CA BOND EXP. PLAN | Bond Expenditure Plan | Department of Health Services | 01/01/1989 | 07/27/1994 | 08/02/1994 |
| CA | CDL | Clandestine Drug Labs | Department of Toxic Substances Control | 06/30/2017 | 08/18/2017 | 09/21/2017 |
| CA | CHMIRS | California Hazardous Material Incident Report System | Office of Emergency Services | 02/15/2018 | 02/20/2018 | 04/03/2018 |
| CA | CORTESE | "Cortese" Hazardous Waste & Substances Sites List | CAL EPA/Office of Emergency Information | 03/26/2018 | 03/27/2018 | 05/04/2018 |
| CA | CUPA SAN FRANCISCO CO | CUPA SAN FRANCISCO CO | San Francisco County Department of Environmen | 04/20/2018 | 04/24/2018 | 05/04/2018 |
| CA | CUPA LIVERMORE-PLEASANTON | CUPA LIVERMORE-PLEASANTON | Livermore-Pleasanton Fire Department | 02/28/2018 | 03/01/2018 | 05/04/2018 |
| CA | DEED | Deed Restriction Listing | DTSC and SWRCB | 02/08/2018 | 02/08/2018 | 02/08/2018 |
| CA | DRYCLEAN SOUTH COAST | DRYCLEAN SOUTH COAST | South Coast Air Quality Management District | 03/16/2018 | 03/20/2018 | 05/04/2018 |
| CA | DRYCLEANERS | Cleaner Facilities | Department of Toxic Substance Control | 03/27/2018 | 03/29/2018 | 05/04/2018 |
| CA | DRYCLEAN AVAQMD | DRYCLEAN AVAQMD | Antelope Valley Air Quality Management Distri | 03/08/2018 | 03/13/2018 | 05/04/2018 |
| CA | EMI | Emissions Inventory Data | California Air Resources Board | 12/31/2015 | 03/21/2017 | 08/15/2017 |
| CA | ENF | Enforcement Action Listing | State Water Resoruces Control Board | 01/22/2018 | 01/24/2018 | 03/19/2018 |
| CA | Financial Assurance 1 | Financial Assurance Information Listing | Department of Toxic Substances Control | 01/22/2018 | 01/24/2018 | 03/20/2018 |
| CA | Financial Assurance 2 | Financial Assurance Information Listing | California Integrated Waste Management Board | 02/14/2018 | 02/16/2018 | 04/03/2018 |
| CA | HAULERS | Registered Waste Tire Haulers Listing | Integrated Waste Management Board | 02/08/2018 | 02/09/2018 | 03/20/2018 |
| CA | HAZNET | Facility and Manifest Data | California Environmental Protection Agency | 12/31/2016 | 07/12/2017 | 10/17/2017 |
| CA | HIST CORTESE | Hazardous Waste & Substance Site List | Department of Toxic Substances Control | 04/01/2001 | 01/22/2009 | 04/08/2009 |
| CA | HWP | EnviroStor Permitted Facilities Listing | Department of Toxic Substances Control | 02/20/2018 | 02/21/2018 | 04/03/2018 |
| CA | HWT | Registered Hazardous Waste Transporter Database | Department of Toxic Substances Control | 01/08/2018 | 01/09/2018 | 02/06/2018 |
| CA | ICE | ICE | Department of Toxic Subsances Control | 02/20/2018 | 02/21/2018 | 04/03/2018 |
| CA | LDS | Land Disposal Sites Listing (GEOTRACKER) | State Water Qualilty Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | LIENS | Environmental Liens Listing | Department of Toxic Substances Control | 01/28/2018 | 03/01/2018 | 04/16/2018 |
| CA | MCS | Military Cleanup Sites Listing (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 03/21/2018 |
| CA | MINES | Mines Site Location Listing | Department of Conservation | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | MWMP | Medical Waste Management Program Listing | Department of Public Health | 02/27/2018 | 03/05/2018 | 04/16/2018 |
| CA | NPDES | NPDES Permits Listing | State Water Resources Control Board | 03/14/2018 | 03/14/2018 | 05/04/2018 |
| CA | PEST LIC | Pesticide Regulation Licenses Listing | Department of Pesticide Regulation | 03/05/2018 | 03/05/2018 | 04/19/2018 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| CA | PROC | Certified Processors Database | Department of Conservation | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | NOTIFY 65 | Proposition 65 Records | State Water Resources Control Board | 03/23/2018 | 03/27/2018 | 05/04/2018 |
| CA | SCH | School Property Evaluation Program | Department of Toxic Substances Control | 01/30/2018 | 01/31/2018 | 03/19/2018 |
| CA | SPILLS 90 | SPILLS90 data from FirstSearch | FirstSearch | 06/06/2012 | 01/03/2013 | 02/22/2013 |
| CA | TOXIC PITS | Toxic Pits Cleanup Act Sites | State Water Resources Control Board | 07/01/1995 | 08/30/1995 | 09/26/1995 |
| CA | UIC | UIC Listing | Deaprtment of Conservation | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | WASTEWATER PITS | Oil Wastewater Pits Listing | RWQCB, Central Valley Region | 04/15/2015 | 04/17/2015 | 06/23/2015 |
| CA | WDS | Waste Discharge System | State Water Resources Control Board | 06/19/2007 | 06/20/2007 | 06/29/2007 |
| CA | WIP | Well Investigation Program Case List | Los Angeles Water Quality Control Board | 07/03/2009 | 07/21/2009 | 08/03/2009 |
| CA | WMUDS/SWAT | Waste Management Unit Database | State Water Resources Control Board | 04/01/2000 | 04/10/2000 | 05/10/2000 |
| CA | CERS TANKS | California Environmental Reporting System (CERS) Tanks | California Environmental Protection Agency | 04/23/2018 | 04/24/2018 | 06/07/2018 |
| CA | UIC GEO | UIC GEO (GEOTRACKER) | State Water Resource Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | PROD WATER PONDS | PROD WATER PONDS (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | OTHER OIL GAS | OTHER OIL & GAS (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | CERS | CalEPA Regulated Site Portal Data | California Environmental Protection Agency | 04/23/2018 | 04/24/2018 | 06/07/2018 |
| US | UXO | Unexploded Ordnance Sites | Department of Defense | 09/30/2016 | 10/31/2017 | 01/12/2018 |
| US | DOCKET HWC | Hazardous Waste Compliance Docket Listing | Environmental Protection Agency | 01/04/2018 | 01/19/2018 | 04/13/2018 |
| CA | MILITARY PRIV SITES | Military Privatized Sites (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | PROJECT | PROJECT (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| US | ABANDONED MINES | Abandoned Mines | Department of Interior | 03/08/2018 | 03/13/2018 | 06/08/2018 |
| US | ECHO | Enforcement & Compliance History Information | Environmental Protection Agency | 02/25/2018 | 03/17/2018 | 06/08/2018 |
| US | FUELS PROGRAM | EPA Fuels Program Registered Listing | EPA | 02/20/2018 | 02/21/2018 | 03/23/2018 |
| CA | CERS HAZ WASTE | CERS HAZ WASTE | CalEPA | 04/23/2018 | 04/24/2018 | 06/07/2018 |
| CA | NON-CASE INFO | NON-CASE INFO (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | SAMPLING POINT | SAMPLING POINT (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| US | IHS OPEN DUMPS | Open Dumps on Indian Land | Department of Health & Human Serivces, Indian | 04/01/2014 | 08/06/2014 | 01/29/2015 |
| CA | WELL STIM PROJ | WELL SAMP PROJ (GEOTRACKER) | State Water Resources Control Board | 03/12/2018 | 03/14/2018 | 05/04/2018 |
| CA | CIWQS | The California Integrated Water Quality System | State Water Resources Control Board | 03/05/2018 | 03/05/2018 | 05/04/2018 |

**HISTORICAL USE RECORDS**

| | | | | | | |
|---|---|---|---|---|---|---|
| US | EDR MGP | EDR Proprietary Manufactured Gas Plants | EDR, Inc. | | | |
| US | EDR Hist Auto | EDR Exclusive Historical Auto Stations | EDR, Inc. | | | |
| US | EDR Hist Cleaner | EDR Exclusive Historical Cleaners | EDR, Inc. | | | |
| CA | RGA LF | Recovered Government Archive Solid Waste Facilities List | Department of Resources Recycling and Recover | | 07/01/2013 | 01/13/2014 |
| CA | RGA LUST | Recovered Government Archive Leaking Underground Storage Tan | State Water Resources Control Board | | 07/01/2013 | 12/30/2013 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| **COUNTY RECORDS** | | | | | | |
| CA | CS ALAMEDA | Contaminated Sites | Alameda County Environmental Health Services | 01/09/2018 | 01/11/2018 | 02/22/2018 |
| CA | UST ALAMEDA | Underground Tanks | Alameda County Environmental Health Services | 04/05/2018 | 04/10/2018 | 05/04/2018 |
| CA | CUPA AMADOR | CUPA Facility List | Amador County Environmental Health | 03/01/2018 | 03/05/2018 | 03/15/2018 |
| CA | CUPA BUTTE | CUPA Facility Listing | Public Health Department | 04/21/2017 | 04/25/2017 | 08/09/2017 |
| CA | CUPA CALVERAS | CUPA Facility Listing | Calveras County Environmental Health | 01/25/2018 | 01/26/2018 | 03/14/2018 |
| CA | CUPA COLUSA | CUPA Facility List | Health & Human Services | 02/26/2018 | 03/01/2018 | 03/15/2018 |
| CA | SL CONTRA COSTA | Site List | Contra Costa Health Services Department | 02/22/2018 | 02/27/2018 | 04/16/2018 |
| CA | CUPA DEL NORTE | CUPA Facility List | Del Norte County Environmental Health Divisio | 01/05/2018 | 02/02/2018 | 03/14/2018 |
| CA | CUPA EL DORADO | CUPA Facility List | El Dorado County Environmental Management Dep | 03/05/2018 | 03/08/2018 | 04/16/2018 |
| CA | CUPA FRESNO | CUPA Resources List | Dept. of Community Health | 03/01/2018 | 03/05/2018 | 03/14/2018 |
| CA | CUPA GLENN | CUPA Facility List | Glenn County Air Pollution Control District | 01/22/2018 | 01/24/2018 | 03/14/2018 |
| CA | CUPA HUMBOLDT | CUPA Facility List | Humboldt County Environmental Health | 03/05/2018 | 03/08/2018 | 04/30/2018 |
| CA | CUPA IMPERIAL | CUPA Facility List | San Diego Border Field Office | 01/22/2018 | 01/26/2018 | 03/14/2018 |
| CA | CUPA INYO | CUPA Facility List | Inyo County Environmental Health Services | 06/08/2017 | 06/09/2017 | 08/04/2017 |
| CA | UST KERN | Underground Storage Tank Sites & Tank Listing | Kern County Environment Health Services Depar | 02/02/2018 | 02/02/2018 | 03/28/2018 |
| CA | CUPA KINGS | CUPA Facility List | Kings County Department of Public Health | 11/14/2017 | 11/17/2017 | 12/15/2017 |
| CA | CUPA LAKE | CUPA Facility List | Lake County Environmental Health | 02/06/2018 | 02/09/2018 | 03/14/2018 |
| CA | CUPA LASSEN | CUPA Facility List | Lassen County Environmental Health | 01/22/2018 | 01/24/2018 | 03/14/2018 |
| CA | AOCONCERN | San Gabriel Valley Areas of Concern | EPA Region 9 | 03/30/2009 | 03/31/2009 | 10/23/2009 |
| CA | HMS LOS ANGELES | HMS: Street Number List | Department of Public Works | 01/16/2018 | 01/23/2018 | 03/20/2018 |
| CA | LF LOS ANGELES | List of Solid Waste Facilities | La County Department of Public Works | 01/16/2018 | 01/16/2018 | 02/14/2018 |
| CA | LF LOS ANGELES CITY | City of Los Angeles Landfills | Engineering & Construction Division | 01/01/2018 | 05/01/2018 | 05/14/2018 |
| CA | SITE MIT LOS ANGELES | Site Mitigation List | Community Health Services | 01/01/2018 | 01/17/2018 | 02/14/2018 |
| CA | UST EL SEGUNDO | City of El Segundo Underground Storage Tank | City of El Segundo Fire Department | 01/21/2017 | 04/19/2017 | 05/10/2017 |
| CA | UST LONG BEACH | City of Long Beach Underground Storage Tank | City of Long Beach Fire Department | 03/09/2017 | 03/10/2017 | 05/03/2017 |
| CA | UST TORRANCE | City of Torrance Underground Storage Tank | City of Torrance Fire Department | 01/04/2018 | 01/05/2018 | 01/18/2018 |
| CA | CUPA MADERA | CUPA Facility List | Madera County Environmental Health | 02/21/2018 | 02/22/2018 | 04/03/2018 |
| CA | UST MARIN | Underground Storage Tank Sites | Public Works Department Waste Management | 03/30/2018 | 04/06/2018 | 05/04/2018 |
| CA | CUPA MERCED | CUPA Facility List | Merced County Environmental Health | 01/11/2018 | 01/12/2018 | 02/08/2018 |
| CA | CUPA MONO | CUPA Facility List | Mono County Health Department | 02/22/2018 | 02/27/2018 | 03/14/2018 |
| CA | CUPA MONTEREY | CUPA Facility Listing | Monterey County Health Department | 03/27/2018 | 03/29/2018 | 04/16/2018 |
| CA | LUST NAPA | Sites With Reported Contamination | Napa County Department of Environmental Manag | 01/09/2017 | 01/11/2017 | 03/02/2017 |
| CA | UST NAPA | Closed and Operating Underground Storage Tank Sites | Napa County Department of Environmental Manag | 02/22/2018 | 02/27/2018 | 03/29/2018 |
| CA | CUPA NEVADA | CUPA Facility List | Community Development Agency | 01/31/2018 | 02/01/2018 | 03/14/2018 |
| CA | IND_SITE ORANGE | List of Industrial Site Cleanups | Health Care Agency | 02/05/2018 | 02/13/2018 | 04/03/2018 |
| CA | LUST ORANGE | List of Underground Storage Tank Cleanups | Health Care Agency | 02/05/2018 | 02/13/2018 | 03/20/2018 |
| CA | UST ORANGE | List of Underground Storage Tank Facilities | Health Care Agency | 01/02/2018 | 02/07/2018 | 03/28/2018 |
| CA | MS PLACER | Master List of Facilities | Placer County Health and Human Services | 03/15/2018 | 03/19/2018 | 05/04/2018 |
| CA | CUPA PLUMAS | CUPA Facility List | Plumas County Environmental Health | 01/22/2018 | 01/24/2018 | 03/15/2018 |
| CA | LUST RIVERSIDE | Listing of Underground Tank Cleanup Sites | Department of Environmental Health | 04/05/2018 | 04/10/2018 | 05/04/2018 |
| CA | UST RIVERSIDE | Underground Storage Tank Tank List | Department of Environmental Health | 04/05/2018 | 04/10/2018 | 05/04/2018 |
| CA | CS SACRAMENTO | Toxic Site Clean-Up List | Sacramento County Environmental Management | 11/02/2017 | 01/03/2018 | 02/05/2018 |
| CA | ML SACRAMENTO | Master Hazardous Materials Facility List | Sacramento County Environmental Management | 11/02/2017 | 01/03/2018 | 02/14/2018 |
| CA | CUPA SAN BENITO | CUPA Facility List | San Benito County Environmental Health | 11/01/2017 | 11/03/2017 | 11/17/2017 |
| CA | PERMITS SAN BERNARDINO | Hazardous Material Permits | San Bernardino County Fire Department Hazardo | 11/30/2017 | 12/01/2017 | 01/16/2018 |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

| St | Acronym | Full Name | Government Agency | Gov Date | Arvl. Date | Active Date |
|---|---|---|---|---|---|---|
| CA | HMMD SAN DIEGO | Hazardous Materials Management Division Database | Hazardous Materials Management Division | 03/05/2018 | 03/07/2018 | 04/16/2018 |
| CA | LF SAN DIEGO | Solid Waste Facilities | Department of Health Services | 10/31/2015 | 11/07/2015 | 01/04/2016 |
| CA | SAN DIEGO CO LOP | Local Oversight Program Listing | Department of Environmental Health | 04/18/2018 | 04/23/2018 | 05/04/2018 |
| CA | SAN DIEGO CO. SAM | Environmental Case Listing | San Diego County Department of Environmental | 03/23/2010 | 06/15/2010 | 07/09/2010 |
| CA | LUST SAN FRANCISCO | Local Oversite Facilities | Department Of Public Health San Francisco Cou | 09/19/2008 | 09/19/2008 | 09/29/2008 |
| CA | UST SAN FRANCISCO | Underground Storage Tank Information | Department of Public Health | 11/02/2017 | 11/07/2017 | 12/19/2017 |
| CA | UST SAN JOAQUIN | San Joaquin Co. UST | Environmental Health Department | 03/20/2018 | 03/22/2018 | 05/04/2018 |
| CA | CUPA SAN LUIS OBISPO | CUPA Facility List | San Luis Obispo County Public Health Departme | 11/16/2017 | 11/17/2017 | 12/18/2017 |
| CA | BI SAN MATEO | Business Inventory | San Mateo County Environmental Health Service | 03/14/2018 | 03/20/2018 | 05/04/2018 |
| CA | LUST SAN MATEO | Fuel Leak List | San Mateo County Environmental Health Service | 03/15/2018 | 03/20/2018 | 05/04/2018 |
| CA | CUPA SANTA BARBARA | CUPA Facility Listing | Santa Barbara County Public Health Department | 09/08/2011 | 09/09/2011 | 10/07/2011 |
| CA | CUPA SANTA CLARA | Cupa Facility List | Department of Environmental Health | 02/20/2018 | 02/20/2018 | 03/19/2018 |
| CA | HIST LUST SANTA CLARA | HIST LUST - Fuel Leak Site Activity Report | Santa Clara Valley Water District | 03/29/2005 | 03/30/2005 | 04/21/2005 |
| CA | LUST SANTA CLARA | LOP Listing | Department of Environmental Health | 03/03/2014 | 03/05/2014 | 03/18/2014 |
| CA | SAN JOSE HAZMAT | Hazardous Material Facilities | City of San Jose Fire Department | 02/04/2018 | 02/06/2018 | 03/20/2018 |
| CA | CUPA SANTA CRUZ | CUPA Facility List | Santa Cruz County Environmental Health | 01/21/2017 | 02/22/2017 | 05/23/2017 |
| CA | CUPA SHASTA | CUPA Facility List | Shasta County Department of Resource Manageme | 06/15/2017 | 06/19/2017 | 08/09/2017 |
| CA | LUST SOLANO | Leaking Underground Storage Tanks | Solano County Department of Environmental Man | 03/08/2018 | 03/13/2018 | 05/04/2018 |
| CA | UST SOLANO | Underground Storage Tanks | Solano County Department of Environmental Man | 03/08/2018 | 03/13/2018 | 03/29/2018 |
| CA | CUPA SONOMA | Cupa Facility List | County of Sonoma Fire & Emergency Services De | 03/01/2018 | 03/27/2018 | 04/16/2018 |
| CA | LUST SONOMA | Leaking Underground Storage Tank Sites | Department of Health Services | 04/03/2018 | 04/06/2018 | 05/09/2018 |
| CA | CUPA STANISLAUS | CUPA Facility List | Stanislaus County Department of Ennvironmenta | 02/06/2018 | 02/07/2018 | 03/16/2018 |
| CA | UST SUTTER | Underground Storage Tanks | Sutter County Department of Agriculture | 01/08/2018 | 03/01/2018 | 03/30/2018 |
| CA | CUPA TEHAMA | CUPA Facility List | Tehama County Department of Environmental Hea | 01/26/2018 | 02/02/2018 | 03/21/2018 |
| CA | CUPA TRINITY | CUPA Facility List | Department of Toxic Substances Control | 01/22/2018 | 01/25/2018 | 03/19/2018 |
| CA | CUPA TULARE | CUPA Facility List | Tulare County Environmental Health Services D | 03/19/2018 | 03/22/2018 | 04/17/2018 |
| CA | CUPA TUOLUMNE | CUPA Facility List | Divison of Environmental Health | 01/22/2018 | 01/25/2018 | 03/16/2018 |
| CA | BWT VENTURA | Business Plan, Hazardous Waste Producers, and Operating Unde | Ventura County Environmental Health Division | 12/26/2017 | 01/25/2018 | 03/14/2018 |
| CA | LF VENTURA | Inventory of Illegal Abandoned and Inactive Sites | Environmental Health Division | 12/01/2011 | 12/01/2011 | 01/19/2012 |
| CA | LUST VENTURA | Listing of Underground Tank Cleanup Sites | Environmental Health Division | 05/29/2008 | 06/24/2008 | 07/31/2008 |
| CA | MED WASTE VENTURA | Medical Waste Program List | Ventura County Resource Management Agency | 12/26/2017 | 01/25/2018 | 03/20/2018 |
| CA | UST VENTURA | Underground Tank Closed Sites List | Environmental Health Division | 02/28/2018 | 03/14/2018 | 03/30/2018 |
| CA | UST YOLO | Underground Storage Tank Comprehensive Facility Report | Yolo County Department of Health | 03/27/2018 | 04/03/2018 | 05/04/2018 |
| CA | CUPA YUBA | CUPA Facility List | Yuba County Environmental Health Department | 02/01/2018 | 02/02/2018 | 03/21/2018 |

**STREET AND ADDRESS INFORMATION**

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# Property Information Management System

**San Bernardino County**

**Office of the Assessor**

PIMS PACKAGE REPORT FOR PARCEL 1045-121-02-0000

# Property Information

**Parcel was Split**

**Property Address (Main Situs)** Protected per CA. Govt. Code Sect. 6254.21
Protected per CA. Govt. Code Sect. 6254.21

**Owner and Mailing Address** CITY OF UPLAND
Protected per CA. Govt. Code Sect. 6254.21
Protected per CA. Govt. Code Sect. 6254.21

**Effective Date** 04/16/1991

**Parcel** 1045121020000
**Parcel Status** INACTIVE
**Parcel Type** REAL PROPERTY
**Property ID**
**Tax Status** EXEMPT FROM
**Use Code** VACANT
**Land Access** CHECK
**Size** 3.501 TO 7.000 ACRES
**Land Type** SINGLE FAMILY RESIDENTIAL
**District** ONTARIO
**Resp Group** REAL PROPERTY
**Resp Unit** RES ZONE(MAX 14 UTS) &USE EX HPC/MHM(1-14 UTS,CHURC

## Current Owners

**Name** CITY OF UPLAND

**R/I** CORPORATION
**% Int** 100.0000000
**Type** BILLED OWNER
**Acquisition Date** NONE
**Document Date** 01/10/1991
**Inactive Date** 09/12/2017

**Document Numbers**
9101112800000

## Legal Parcel Map

| Parcel Map | Parcel Nbr | Unit | Book | Page |
|---|---|---|---|---|
| | 1045121020000 | | | |

## Legal Description

ONTARIO COLONY LANDS LOTS 443 AND 444 EX TRACT 11631

**No Legal Reason for Change Found**

No Active Homeowner's Exemptions Found

# Prior Roll History

**Year: 2017**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2016**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2015**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2014**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2013**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2012**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2011**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2010**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2009**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2008**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2007**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2006**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2005**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2004**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2003**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2002**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2001**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2000**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1999**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1998**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1997**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1996**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1995**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1994**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1993**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1992**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1991**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1990**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 77,142 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 77,142 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **77,142** |

**Year: 1989**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 75,629 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 75,629 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **75,629** |

**Year: 1988**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 74,146 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 74,146 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **74,146** |

**Year: 1987**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 72,692 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 72,692 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **72,692** |

**Year: 1986**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 71,267 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 71,267 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **71,267** |

**Year: 1985**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 69,870 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 69,870 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **69,870** |

**Year: 1984**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 68,500 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 68,500 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **68,500** |

**Year: 1983**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 69,185 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 69,185 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **69,185** |

**Year: 1982**

| | | | |
|---|---|---|---|
| **TRA** | 8001 | **Land Value** | 68,500 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045121020000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 68,500 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **68,500** |

# Parcel History

| | | |
|---|---|---|
| **Event Date** | 09/13/2017 | **Multi Parcel List** |
| **Event Group/Type** | INACTIVATE - SPLIT | 1045121040000 NEW-SPL |
| **Multi Parcel** | Yes | 1045151350000 NEW-SPL |
| | | 1045121020000 OLD-SPL |
| | | 1045151340000 OLD-SPL |

| | | |
|---|---|---|
| **Event Date** | 01/10/1991 | **Multi Parcel List** |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) | |
| **Multi Parcel** | No | |

| | | |
|---|---|---|
| **Event Date** | 03/30/1983 | **Multi Parcel List** |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) | 0207482050000 TOT-CNV |
| | | 1045121020000 TOT-CNV |
| **Multi Parcel** | Yes | 1045151340000 TOT-CNV |

| | | |
|---|---|---|
| **Event Date** | 03/03/1983 | **Multi Parcel List** |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) | |
| **Multi Parcel** | No | |

| | | |
|---|---|---|
| **Event Date** | 11/02/1982 | **Multi Parcel List** |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) | |
| **Multi Parcel** | No | |

| | | |
|---|---|---|
| **Event Date** | 04/17/1981 | **Multi Parcel List** |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) | |
| **Multi Parcel** | No | |

| | | |
|---|---|---|
| **Event Date** | 04/17/1981 | **Multi Parcel List** |
| **Event Group/Type** | CREATE - SUBDIVISION | 1045101030000 NEW-SUB |
| **Multi Parcel** | Yes | 1045121020000 NEW-SUB |
| | | 1045131010000 NEW-SUB |
| | | 1045131020000 NEW-SUB |
| | | 1045101020000 OLD-SUB |

| | |
|---|---|
| **Event Date** | 12/13/1966 |
| **Event Group/Type** | TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL) |
| **Multi Parcel** | No |

**Multi Parcel List**

# Ownership History

**Owner Name: CITY OF UPLAND**

| | |
|---|---|
| **R/I** | CORPORATION |
| **% Int** | 100.0000000 |
| **Type** | BILLED OWNER |
| **Acquisition Date** | NONE |
| **Document Date** | 01/10/1991 |
| **Inactive Date** | 09/12/2017 |

**Document Numbers**

9101112800000

**Owner Name: UPLAND HILLS COUNTRY CLUB ASSOC LTD**

| | |
|---|---|
| **R/I** | PARTNERSHIP |
| **% Int** | 100.0000000 |
| **Type** | BILLED OWNER |
| **Acquisition Date** | NONE |
| **Document Date** | 03/30/1983 |
| **Inactive Date** | 01/09/1991 |

**Document Numbers**

8306689200000

**Owner Name: MATREYEK, HOMES INC**

| | |
|---|---|
| **R/I** | CORPORATION |
| **% Int** | 100.0000000 |
| **Type** | BILLED OWNER |
| **Acquisition Date** | NONE |
| **Document Date** | 11/02/1982 |
| **Inactive Date** | 03/29/1983 |

**Document Numbers**

8221857600000

**Owner Name: UPLAND HILLS COUNTRY CLUB (ERROR)**

| | |
|---|---|
| **R/I** | SOLE OWNER |
| **% Int** | 100.0000000 |
| **Type** | BILLED OWNER |
| **Acquisition Date** | NONE |
| **Document Date** | 04/17/1981 |
| **Inactive Date** | 11/01/1982 |

**Document Numbers**

8108339200000

**Owner Name: SAN ANTONIO LAND CO**

| | |
|---|---|
| **R/I** | CORPORATION |
| **% Int** | 100.0000000 |
| **Type** | BILLED OWNER |
| **Acquisition Date** | NONE |
| **Document Date** | 12/13/1966 |
| **Inactive Date** | 04/16/1981 |

**Document Numbers**

0000000000447

# Supplement History

**No Supplement History**



# Property Information Management System

**San Bernardino County**

**Office of the Assessor**

PRIOR ROLL VALUES HISTORY REPORT FOR PARCEL 1045-151-34-0000

**Parcel was Split**

| | |
|---|---|
| **Parcel** | 1045151340000 |
| **Parcel Status** | INACTIVE |
| **Parcel Type** | REAL PROPERTY |
| **Property ID** | |
| **Tax Status** | EXEMPT FROM ASSESSMENT |
| **Use Code** | CHECK |
| **Land Access** | CHECK |
| **Size** | 7.001 TO 14.000 ACRES |
| **Land Type** | SINGLE FAMILY RESIDENTIAL |
| **District** | ONTARIO |
| **Resp Group** | REAL PROPERTY |
| **Resp Unit** | COMMERCIAL ZONE OR USE |

## Prior Roll History

**Year: 2017**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2016**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2015**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | | |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2014**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2013**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2012**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2011**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2010**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2009**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2008**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2007**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2006**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2005**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2004**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2003**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2002**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2001**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 2000**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1999**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| | | | |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1998**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1997**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1996**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1995**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1994**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1993**

| | | | |
|---|---|---|---|
| **TRA** | 0 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1992**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1991**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 0 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | CITY OF UPLAND | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 0 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **0** |

**Year: 1990**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 83,787 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 83,787 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **83,787** |

**Year: 1989**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 82,144 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 82,144 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **82,144** |

**Year: 1988**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 80,533 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 80,533 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **80,533** |

**Year: 1987**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 78,954 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 78,954 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **78,954** |

**Year: 1986**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 77,406 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 77,406 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **77,406** |

**Year: 1985**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 75,888 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 75,888 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **75,888** |

**Year: 1984**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 74,400 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | UPLAND HILLS COUNTRY CLUB ASSOC LTD | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 74,400 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **74,400** |

**Year: 1983**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 75,144 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 75,144 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **75,144** |

**Year: 1982**

| | | | |
|---|---|---|---|
| **TRA** | 8006 | **Land Value** | 74,400 |
| **Supplement** | NO | **Improvement Value** | 0 |
| **Correction Date** | | **Improvement Penalty** | 0 |
| **Correction Code** | | **Pers Prop Value** | 0 |
| **Original Parcel** | 1045151340000 | **Pers Prop Penalty** | 0 |
| **Billed Owner** | | **Total Penalties** | 0 |
| **Joint Owner** | | **Total Value** | 74,400 |
| | | **HOX Exemptions** | 0 |
| | | **Special Exemptions** | 0 |
| | | **Net Value** | **74,400** |

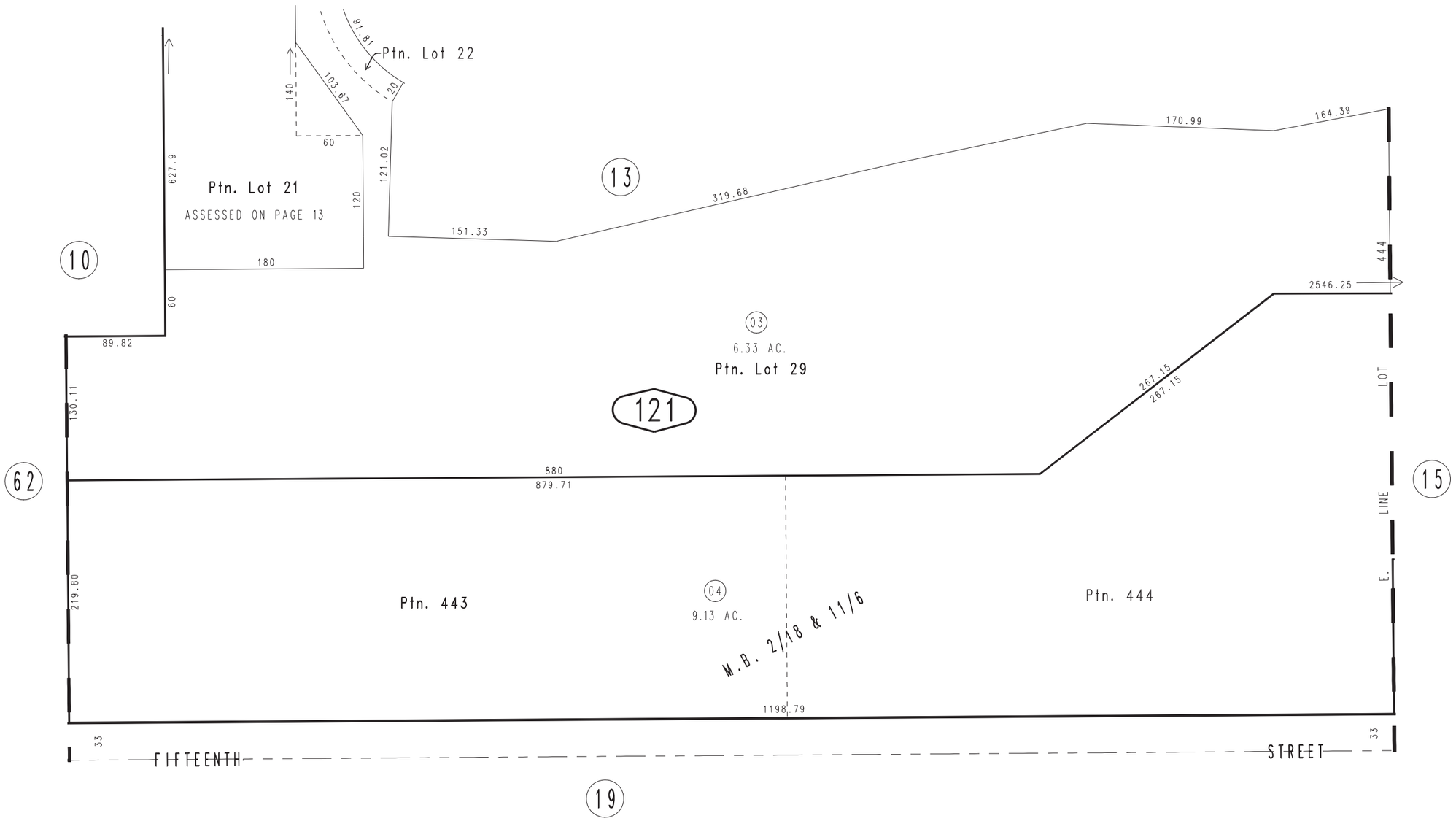
THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

# Ptn. Tract No. 11631, M.B. 158/53-62

City of Upland
Tax Rate Area
8001

1045 - 12

1"=100'




August 2004

Ptn. Ontario Colony Lands, M.B. 2/8 & 11/6

Ptn. N.E.1/4, Sec.5
T.1S.,R.7W., S.B.B.&M.

Assessor's Map
Book 1045 Page 12
San Bernardino County

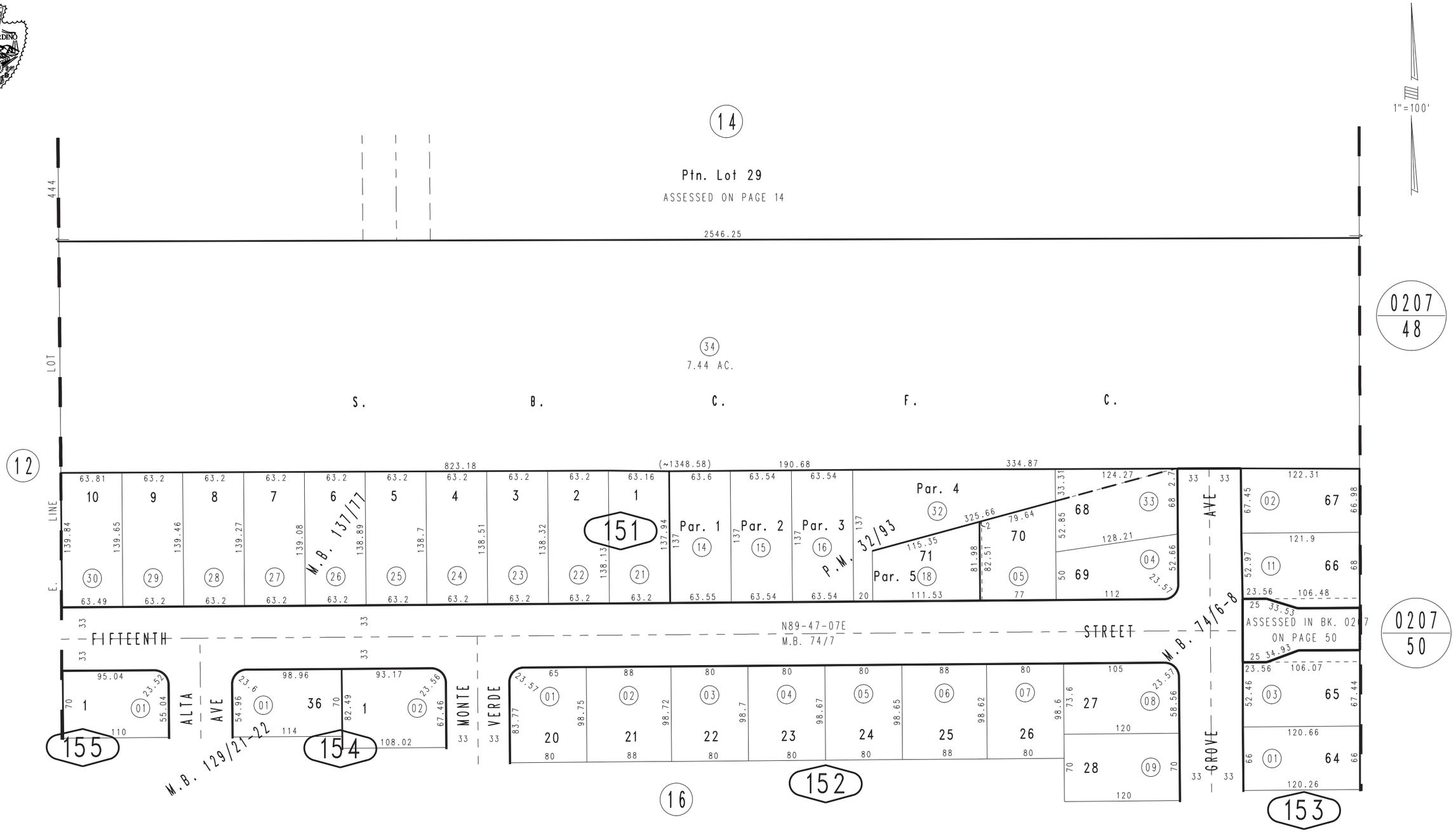
REVISED
11/29/17 KA

THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

# Ptn. Tract No. 11631, M.B. 158/53-62

City of Upland
Tax Rate Area
8006

1045 - 15




Tract No. 9729, M.B. 137/77
Parcel Map No. 3125, P.M. 32/93
Ptn. Tract No. 9199, M.B. 129/21-22
Ptn. Tract No. 5926, M.B. 74/6-8

August 2004

Ptn. N.E.1/4, Sec.5
T.1S.,R.7W.

Assessor's Map
Book 1045 Page 15
San Bernardino County

REVISED
03/26/09 KC

## USER QUESTIONNAIRE

## INTRODUCTION

In order to qualify for one of the *Landowner Liability Protections* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2002, the *user* must provide the following information (if available) to the *environmental professional.* Failure to provide this information could result in a determination that "*all appropriate inquiry*" is not complete.

(1) Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law?

*CIRCLE* YES or NO

If yes, please explain in detail.

(2) Are you aware of any Act Use Limitations (AUL), such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

YES or NO

If yes, please explain.

(3) As the *user* of this Environmental Site Assessment (ESA) do you have any specialized knowledge or familiarity related to the *property* or nearby properties? For example, are you involved in the same line of business as the current or former *occupants* of the *property* or its neighboring *property,* so that you may have specific knowledge of the chemicals and processes used by this type of business?

YES or NO

If yes, please explain.

(4) Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*?

YES *or* NO

If you believe that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property?

YES *or* NO

If yes, please explain. N/A

(5) Are you aware of commonly known or *reasonably* ascertainable information that would help the *environment professional* to identify conditions pinpointing releases or threaten releases of hazardous materials and/ or chemicals? For example, as user,

(a.) Do you know of any past uses of the *property*? YES or NO

*(b.)* Do you know of specific chemicals that are present or once were present at the *property*? YES or NO

(c.) Do you know of any chemical spills or any other chemical releases that have taken place at the *property*? YES or NO

(d.) Do you know of any environmental cleanups that have taken place at the *property*? YES or NO

If any yes, please explain.

(6) As the user of this Environmental Site Assessment (ESA), based on your knowledge and experience related to the *property* are there any *obvious* indicators that point to the presence or likely presence of a contamination at the *property*?

YES or NO

If yes, please explain.

Completed By ROCIUS, DANIEL C.
Print Name

# National Clandestine Laboratory Register - California

| COUNTY | CITY | ADDRESS | DATE |
|---|---|---|---|
| ALAMEDA | BERKELEY | 2240 9TH STREET | 7/19/2008 |
| ALAMEDA | CASTRO VALLEY | 19127 SANTA MARIA AVENUE | 3/24/2010 |
| ALAMEDA | FREMONT | 35856 TOLEDO COURT | 7/28/2006 |
| ALAMEDA | HAYWARD | 333 JACKSON ST 219 | 3/12/2004 |
| ALAMEDA | HAYWARD | 1032 CENTRAL BLVD | 6/9/2004 |
| ALAMEDA | HAYWARD | 231 CULP AVE | 8/29/2004 |
| ALAMEDA | HAYWARD | 27948 PUEBLO SERENA WAY | 1/9/2006 |
| ALAMEDA | HAYWARD | 698 OVERHILL DRIVE | 5/16/2008 |
| ALAMEDA | NEWARK | 37120 SPRUCE ST G | 2/29/2004 |
| ALAMEDA | OAKLAND | 923 39TH STREET | 11/25/2008 |
| ALAMEDA | OAKLAND | 1950 86TH AVENUE | 12/7/2015 |
| ALAMEDA | PLEASANTON | 6443 ALISAL ST | 1/19/2005 |
| ALAMEDA | PLEASANTON | 818 ANGELA STREET | 3/10/2010 |
| ALAMEDA | SAN LEANDRO | 1735 138TH AVE | 2/18/2004 |
| ALAMEDA | SAN LEANDRO | 872 DONOVAN DR | 5/4/2005 |
| ALAMEDA | SAN LEANDRO | 14446 ELM ST | 5/31/2005 |
| ALAMEDA | SAN LEANDRO | 1553 SANTA MARIA ROAD | 11/28/2007 |
| ALAMEDA | SAN LORENZO | 17283 VIA ANNETTE DR | 2/6/2004 |
| ALAMEDA | SAN LORENZO | 1302 VIA SAN JUAN STREET | 10/25/2007 |
| ALAMEDA | SAN LORENZO | 16150 ARRIBA VIADUCT | 4/8/2009 |
| ALAMEDA | UNION CITY | 32673 BRENDA WAY 3 | 9/28/2004 |
| ALAMEDA | UNION CITY | 2351 HARTFORD DRIVE | 4/7/2006 |
| BUTTE | BIGGS | 2164 LARKIN | 4/9/2004 |
| BUTTE | BIGGS | 488 G ST | 10/26/2004 |
| BUTTE | CHICO | 939 W EAST AVE 4 | 4/19/2004 |
| BUTTE | CHICO | 853 E 7TH ST | 7/14/2004 |
| BUTTE | CHICO | 453 POSADA WAY 12 | 8/4/2004 |
| BUTTE | CHICO | 1056 E 8TH ST | 3/18/2005 |
| BUTTE | CHICO | 696 7TH E ST | 10/19/2005 |
| BUTTE | CHICO | 1402 POMONA LN | 11/17/2005 |
| BUTTE | CHICO | 997 E 16TH ST | 12/15/2005 |
| BUTTE | CHICO | 1735 MAGNOLIA AVENUE | 2/26/2007 |
| BUTTE | CHICO | 1024 NEAL DOW AVENUE | 6/7/2008 |
| BUTTE | CHICO | 729 NORD AVENUE | 9/30/2008 |
| BUTTE | DURHAM | 9606 FIMPLE RD | 7/15/2005 |
| BUTTE | DURHAM | 8200 DURNEL DRIVE | 5/22/2010 |
| BUTTE | GRIDLEY | 233 KENTUCKY STREET | 2/21/2006 |
| BUTTE | GRIDLEY | 275 KENTUCKY ST | 2/21/2006 |
| BUTTE | GRIDLEY | 124 EAST GRIDLEY ROAD | 5/14/2010 |
| BUTTE | HONCUT | 16 TRUXTON COURT | 9/2/2008 |
| BUTTE | MAGALIA | 3 JORDAN HILL RD | 3/31/2004 |
| BUTTE | MAGALIA | 14723 GOLD CONE DR | 9/21/2004 |
| BUTTE | OROVILLE | 1940 HELMAN ST | 2/4/2004 |
| BUTTE | OROVILLE | 110 GREENBACK DR | 2/5/2004 |
| BUTTE | OROVILLE | 2437 ORO QUINCY HWY | 3/17/2004 |
| BUTTE | OROVILLE | 126 CANYON HIGHLANDS DR | 5/5/2004 |
| BUTTE | OROVILLE | 208 MISTY VIEW LN | 5/10/2004 |
| BUTTE | OROVILLE | 2750 DE BANGAR HWY | 7/21/2004 |
| BUTTE | OROVILLE | 2720 ORO DAM BLVD 6A | 8/3/2004 |
| BUTTE | OROVILLE | 1130 TEHAMA ST | 1/12/2005 |
| BUTTE | OROVILLE | 1915 PLUMAS ST | 6/9/2005 |

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| COUNTY | CITY | ADDRESS | DATE |
|---|---|---|---|
| BUTTE | OROVILLE | 2794 OAK KNOLL WAY | 11/30/2005 |
| BUTTE | OROVILLE | 91 TOYON HILLS DRIVE | 2/23/2007 |
| BUTTE | OROVILLE | 165 HURLES CIRCLE | 3/18/2007 |
| BUTTE | OROVILLE | 4210 ORO BANGOR HIGHWAY | 6/1/2007 |
| BUTTE | OROVILLE | 2349 VIA MADERO | 9/11/2007 |
| BUTTE | OROVILLE | 1616 ORO DAM BOULEVARD | 10/29/2007 |
| BUTTE | OROVILLE | 1660 20TH STREET | 1/31/2008 |
| BUTTE | OROVILLE | 3 ALVERDA DRIVE | 5/13/2008 |
| BUTTE | OROVILLE | 1840 7TH STREET | 9/17/2008 |
| BUTTE | OROVILLE | 1960 ROSE STREET | 4/7/2009 |
| BUTTE | OROVILLE | 5075 LOWER WYANDOTTE AVENUE | 4/7/2009 |
| BUTTE | PALERMO | 2398 LOUIS AVENUE | 8/27/2007 |
| BUTTE | PARADISE | 6441 MOSS LN | 3/31/2004 |
| BUTTE | PARADISE | 538 CASTLE | 7/23/2004 |
| BUTTE | PARADISE | 5955 HAZEL WAY | 5/25/2006 |
| CALAVERAS | MOUNTAIN RANCH | 5645 DOSTER RD | 12/20/2004 |
| CONTRA COSTA | ANTIOCH | 1927 BIRCH AVE | 12/12/2004 |
| CONTRA COSTA | BAY POINT | 71 MOUNTAIN VIEW AVENUE | 3/22/2011 |
| CONTRA COSTA | BRENTWOOD | 1880 EAST EDEN PLAINS STREET | 10/2/2014 |
| CONTRA COSTA | BRENTWOOD | 638 SUMMERWOOD DRIVE | 2/11/2010 |
| CONTRA COSTA | CROCKETT | 815 1ST AVENUE | 12/9/2010 |
| CONTRA COSTA | EL SOBRANTE | 2211 RANCHO ROAD | 9/20/2007 |
| CONTRA COSTA | MARTINEZ | 625 MARINA VISTA ST | 3/22/2005 |
| CONTRA COSTA | RICHMOND | 2420 ESMOND AVENUE | 12/5/2006 |
| CONTRA COSTA | RICHMOND | 712 BRADFORD DRIVE | 7/29/2008 |
| CONTRA COSTA | RODEO | 1120 4TH ST | 7/8/2004 |
| DEL NORTE | CRESCENT CITY | 1733 WILDWOOD LN | 4/14/2004 |
| EL DORADO | EL DORADO | 6841 UNION MINE RD | 4/29/2004 |
| FRESNO | CARUTHERS | 14594 SOUTH ELM AVENUE | 11/28/2006 |
| FRESNO | CLOVIS | 287 WEST BARSTOW AVENUE 125B | 10/26/2012 |
| FRESNO | COALINGA | 47932 LOST HILLS RD | 8/30/2004 |
| FRESNO | DOS PALOS | 43186 MERRILL AVENUE | 4/15/2010 |
| FRESNO | DOS PALOS | 43186 MERRILL AVENUE | 4/15/2010 |
| FRESNO | FOWLER | 6424 SOUTH FOWLER AVENUE | 8/21/2007 |
| FRESNO | FRESNO | 12884 S ELM AVE | 7/15/2004 |
| FRESNO | FRESNO | 1315 E CORNELL | 7/15/2004 |
| FRESNO | FRESNO | 7090 N FRUIT AVE 140 | 7/29/2004 |
| FRESNO | FRESNO | 4822 E MONO ST | 6/9/2005 |
| FRESNO | FRESNO | 2540 NORTH FLOYD AVENUE | 11/24/2006 |
| FRESNO | FRESNO | 8971 MOUNTAIN VIEW | 12/13/2006 |
| FRESNO | FRESNO | 4409 EAST HEDGES AVENUE A | 12/16/2008 |
| FRESNO | FRESNO | 3001 WEST SWIFT AVE AVENUE 104 | 8/6/2013 |
| FRESNO | FRESNO | 4851 NORTH N CEDAR AVE AVENUE 117 | 1/6/2014 |
| FRESNO | FRESNO | 3852 EAST E OLIVE AVE AVENUE 201 | 1/14/2014 |
| FRESNO | FRESNO | 3025 EAST E GETTYSBURG AVE AVENUE 102 | 1/21/2014 |

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|---|---|---|---|
| FRESNO | FRESNO | 7675 N FIRST STREET BOX 203 | 9/6/2015 |
| FRESNO | FRESNO | 4102 E north AVENUE | 12/24/2015 |
| FRESNO | FRESNO | 2715 N Millbrook AVENUE | 2/3/2016 |
| FRESNO | REEDLEY | 22134 E HOGAN AVE | 1/15/2004 |
| FRESNO | REEDLEY | 20069 CLAYTON AVENUE | 12/8/2007 |
| FRESNO | SAN JOAQUIN | 2243 ELDORADO S B | 3/10/2006 |
| FRESNO | SQUAW VALLEY | 46992 CREEKSIDE ROAD | 11/18/2013 |
| GLENN | WILLOWS | 5627 COUNTY ROAD 69 | 5/12/2004 |
| HUMBOLDT | ARCATA | 258 LUPIN AVENUE | 8/30/2006 |
| HUMBOLDT | BLUE LAKE | 113 RAYMAR AVE | 5/9/2005 |
| HUMBOLDT | EUREKA | 1984 GAGE LN | 4/27/2004 |
| HUMBOLDT | EUREKA | 1034 14TH ST | 6/6/2005 |
| HUMBOLDT | EUREKA | 1323 SUMMER STREET | 6/15/2006 |
| HUMBOLDT | FORTUNA | 1788 PENN AVE | 3/2/2004 |
| HUMBOLDT | MCKINLEYVILLE | 2331 CENTRAL AVE 4 | 3/25/2004 |
| IMPERIAL | HOLTVILLE | 819 1/2 FERN ST | 1/28/2004 |
| IMPERIAL | HOLTVILLE | 2300 SLAYTON RD | 2/5/2004 |
| IMPERIAL | HOLTVILLE | 819 1/2 FERN AVE | 3/20/2006 |
| IMPERIAL | SEELEY | 2205 HASKELL RD | 7/20/2004 |
| KERN | BAKERSFIELD | 8614 FULLER | 2/22/2004 |
| KERN | BAKERSFIELD | 2600 NORMAN AVE | 5/26/2004 |
| KERN | BAKERSFIELD | 8614 FULLER | 6/18/2004 |
| KERN | BAKERSFIELD | 321 OAKDALE DR | 3/15/2005 |
| KERN | BAKERSFIELD | 2714 ALLEN RD | 3/22/2005 |
| KERN | BAKERSFIELD | 2314 CENTER ST | 10/19/2005 |
| KERN | BAKERSFIELD | 200 MIRAFLORES | 2/28/2006 |
| KERN | BAKERSFIELD | 101 AGARNSEY LN | 3/20/2006 |
| KERN | BAKERSFIELD | 109 CLYDE STREET | 4/26/2006 |
| KERN | BAKERSFIELD | 200 MIRAFLORES AVENUE | 3/18/2007 |
| KERN | BAKERSFIELD | 8TH STREET | 6/22/2009 |
| KERN | BAKERSFIELD | 3801 NEWCOMBE COURT | 3/3/2011 |
| KERN | BAKERSFIELD | 3804 LA TONIA COURT | 3/3/2011 |
| KERN | BAKERSFIELD | 218 EL TEJON AVENUE | 7/8/2011 |
| KERN | BAKERSFIELD | 7601 REDBANK | 12/13/2011 |
| KERN | DELANO | 1305 20TH AVE | 2/4/2004 |
| KERN | JOHANNESBURG | 405 BROADWAY AVENUE | 10/9/2008 |
| KERN | LAKE ISABELLA | 3105 WENYOR | 9/21/2004 |
| KERN | LAMONT | 10224 SAN EMIDIO STREET | 7/11/2007 |
| KERN | LAMONT | 8008 MIDDLETON LANE | 5/19/2008 |
| KERN | RIDGECREST | 709 W ATKINS AVE | 12/9/2004 |
| KERN | RIDGECREST | 345 WEST MOYER AVENUE | 6/4/2007 |
| KERN | SHAFTER | 18478 S SHAFTER AVE | 1/23/2004 |
| KERN | SHAFTER | 31396 BURBANK AVE | 6/12/2004 |
| KERN | TAFT | 412 KERN ST | 8/26/2004 |
| KERN | TAFT | 217 LIERLY ST | 6/20/2005 |
| KINGS | HANFORD | 11111 9 3/4 AVENUE | 4/16/2007 |
| KINGS | UNINCORPORATED CITY | 6260 BARSTOW AVE | 5/21/2004 |
| LAKE | CLEARLAKE | 13660 EAST LAKE DR | 4/19/2004 |
| LAKE | CLEARLAKE | 15888 19TH ST | 4/28/2004 |
| LAKE | CLEARLAKE | 16537 35TH AVE | 6/18/2005 |
| LAKE | CLEARLAKE | 13820 MANAKEE DRIVE | 1/20/2010 |

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|---|---|---|---|
| LAKE | FINLEY | 3424 STONE DR | 9/15/2004 |
| LAKE | LAKEPORT | 525 ESPLANADE ST | 1/27/2004 |
| LAKE | LOWER LAKE | 10243 SIEGLER CANYON RD | 11/17/2004 |
| LAKE | NICE | 6643 COLLIER | 2/15/2006 |
| LOS ANGELES | ARTESIA | 11635 ARTESIA BOULEVARD | 5/1/2013 |
| LOS ANGELES | BALDWIN PARK | 3109 ROBINETTE AVE | 9/28/2004 |
| LOS ANGELES | BALDWIN PARK | 4442 EDRA AVENUE | 6/16/2008 |
| LOS ANGELES | BELL | 3717 BELL AVENUE | 6/6/2009 |
| LOS ANGELES | BELL GARDENS | 7534 PURDY STREET | 5/1/2010 |
| LOS ANGELES | BELLFLOWER | 17122 DOWNEY AVENUE | 11/2/2008 |
| LOS ANGELES | BEVERLY HILLS | 712 NORTH REXFORD DRIVE | 6/1/2013 |
| LOS ANGELES | CERRITOS | 12513 SANDY CREEK LANE | 3/9/2007 |
| LOS ANGELES | CITY OF COMMERCE | 5820 RAMON CT | 4/14/2005 |
| LOS ANGELES | COMPTON | 1016 POINSETTIA S AVE | 3/10/2004 |
| LOS ANGELES | COMPTON | 14502 S Keene Ave | 8/14/2016 |
| LOS ANGELES | COVINA | 444 CITRUS N AVE | 1/13/2004 |
| LOS ANGELES | COVINA | 19850 ARROW HIGHWAY | 8/6/2006 |
| LOS ANGELES | COVINA | 771 Rancho Simi Drive | 6/1/2016 |
| LOS ANGELES | DIAMOND BAR | 2620 CASTLEROCK ROAD | 8/1/2006 |
| LOS ANGELES | DIAMOND BAR | 749 FEATHERWOOD DRIVE | 11/1/2007 |
| LOS ANGELES | DOWNEY | 9322 STAMPS AVE | 2/18/2005 |
| LOS ANGELES | DOWNEY | 10350 HALEDON AVENUE | 5/21/2008 |
| LOS ANGELES | EAST LOS ANGELES | 4135 FLORAL AVE | 3/5/2004 |
| LOS ANGELES | EL MONTE | 11828 EMERY ST | 11/18/2004 |
| LOS ANGELES | EL MONTE | 4350 RANGER AVE | 11/29/2004 |
| LOS ANGELES | ENCINO | 17448 VENTURA BOULEVARD | 8/11/2008 |
| LOS ANGELES | GARDENA | 14903 CHADRON AVE 1 | 3/1/2006 |
| LOS ANGELES | GARDENA | 1218 W 134th St | 9/25/2016 |
| LOS ANGELES | GLENDORA | 19104 MANUA LOA | 7/21/2004 |
| LOS ANGELES | HAWTHORNE | 12600 PRAIRIE AVENUE | 7/19/2010 |
| LOS ANGELES | HAWTHORNE | 2851 WEST 120TH STREET | 7/22/2010 |
| LOS ANGELES | HAWTHORNE | 13611 DOTY AVENUE | 2/3/2011 |
| LOS ANGELES | HAWTHORNE | 13611 DOTY AVENUE | 2/3/2011 |
| LOS ANGELES | HUNTINGTON PARK | 2505 OLIVE STREET | 5/15/2007 |
| LOS ANGELES | HUNTINGTON PARK | 6418 SEVILLE | 9/18/2007 |
| LOS ANGELES | HUNTINGTON PARK | 2409 OLIVE STREET | 11/18/2008 |
| LOS ANGELES | INGLEWOOD | 8815 SOUTH VAN NESS AVENUE | 5/4/2010 |
| LOS ANGELES | LA CANADA FLINTRIDGE | 5016 ANGELES CREST HWY | 5/25/2004 |
| LOS ANGELES | LA PUENTE | 410 EVANWOOD AVE | 9/22/2004 |
| LOS ANGELES | LA PUENTE | 18631 ALTARIO ST | 1/13/2005 |
| LOS ANGELES | LANCASTER | 3995 AVENUE H W | 3/3/2004 |
| LOS ANGELES | LANCASTER | 42705 6TH E ST | 2/3/2005 |
| LOS ANGELES | LANCASTER | 44634 DATE AVENUE | 6/2/2006 |
| LOS ANGELES | LANCASTER | 45448 ELM | 7/14/2007 |
| LOS ANGELES | LANCASTER | 42835 SAN FRANCISCO AV | 12/10/2017 |
| LOS ANGELES | LITTLEROCK | 8632 AVENUE U E | 1/21/2004 |
| LOS ANGELES | LLANO | 25757 V E AVE | 3/24/2004 |
| LOS ANGELES | LONG BEACH | 2520 PACIFIC COAST E HWY 221 | 1/27/2004 |
| LOS ANGELES | LONG BEACH | 1401 11 E ST | 7/1/2004 |
| LOS ANGELES | LONG BEACH | 2124 MC KENZIE AVENUE | 4/25/2006 |
| LOS ANGELES | LONG BEACH | 1624 JUNIPERO AVENUE | 4/4/2007 |

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| LOS ANGELES | LONG BEACH | 3613 LA JARA STREET | 11/14/2007 |
| LOS ANGELES | LONG BEACH | 1875 LIME AVENUE | 12/22/2008 |
| LOS ANGELES | LONG BEACH | 2345 EAST HARDING STREET | 2/4/2010 |
| LOS ANGELES | LONG BEACH | 2454 EASY AVENUE | 2/10/2010 |
| LOS ANGELES | LOS ANGELES | 2742 LANFRANCO ST 7 | 1/7/2004 |
| LOS ANGELES | LOS ANGELES | 560 KEENAN AVE | 5/12/2004 |
| LOS ANGELES | LOS ANGELES | 5320 1/2 ITHACA AVE | 6/22/2004 |
| LOS ANGELES | LOS ANGELES | 21150 HOBART | 8/18/2004 |
| LOS ANGELES | LOS ANGELES | 1406 GORDON STREET | 3/26/2006 |
| LOS ANGELES | LOS ANGELES | 123 S LAKE STREET | 7/14/2006 |
| LOS ANGELES | LOS ANGELES | 3015 SUNNYNOOK DRIVE | 8/11/2006 |
| LOS ANGELES | LOS ANGELES | 244 47TH PLACE | 10/12/2006 |
| LOS ANGELES | LOS ANGELES | 244 WEST 47TH PLACE | 10/12/2006 |
| LOS ANGELES | LOS ANGELES | 11630 WEST 207TH STREET | 12/7/2006 |
| LOS ANGELES | LOS ANGELES | 321 WESTMINSTER AVENUE | 8/9/2007 |
| LOS ANGELES | LOS ANGELES | 1216 HANOVER AVENUE | 8/12/2007 |
| LOS ANGELES | LOS ANGELES | 359 71ST STREET | 10/10/2007 |
| LOS ANGELES | LOS ANGELES | 3744 59TH STREET | 12/20/2007 |
| LOS ANGELES | LOS ANGELES | 218 1/2 54TH STREET | 3/14/2008 |
| LOS ANGELES | LOS ANGELES | 4154 COMPTON AVENUE | 4/17/2008 |
| LOS ANGELES | LOS ANGELES | 6118 HOOPER STREET | 4/24/2009 |
| LOS ANGELES | LOS ANGELES | 5170 SOUTH NORMANDIE AVENUE | 1/3/2010 |
| LOS ANGELES | LOS ANGELES | 2109 ESTRELLA AVENUE | 2/2/2010 |
| LOS ANGELES | LOS ANGELES | 6516 SOUTH MAIN STREET | 6/2/2010 |
| LOS ANGELES | LOS ANGELES | 213 1/2 WEST 66 STREET | 9/21/2010 |
| LOS ANGELES | LOS ANGELES | 1564 EAST 117TH STREET | 4/4/2013 |
| LOS ANGELES | LYNWOOD | 10868 DRURY LN | 10/29/2004 |
| LOS ANGELES | NORTH HOLLYWOOD | 7829 NAGLE AV | 12/10/2017 |
| LOS ANGELES | NORWALK | 11026 IMPERIAL E HWY 10 | 4/21/2004 |
| LOS ANGELES | NORWALK | 12618 STUDEBAKER ROAD | 6/14/2010 |
| LOS ANGELES | PALMDALE | 38233 HENDON DR | 4/3/2004 |
| LOS ANGELES | PALMDALE | 38566 EAST 35TH STREET | 10/3/2006 |
| LOS ANGELES | PANORAMA CITY | 8154 ALLOTT | 1/19/2006 |
| LOS ANGELES | POMONA | 320 JEFFERSON W AVE | 10/19/2004 |
| LOS ANGELES | POMONA | 1347 CAMBRIN ROAD | 12/7/2006 |
| LOS ANGELES | POMONA | 260 LA VERNE AVENUE | 7/12/2007 |
| LOS ANGELES | REDONDO BEACH | 208 B AVE | 1/4/2004 |
| LOS ANGELES | SAN DIMAS | 1717 MONTE VISTA DR | 10/7/2004 |
| LOS ANGELES | SAN PEDRO | 975 5TH W ST | 8/3/2005 |
| LOS ANGELES | SANTA FE SPRINGS | 11462 TELEGRAPH RD | 1/14/2004 |
| LOS ANGELES | SANTA FE SPRINGS | 13310 TELEGRAPH ROAD | 4/14/2010 |
| LOS ANGELES | SHADOW HILLS | 10339 JOHANNA AVENUE | 6/22/2006 |
| LOS ANGELES | SIGNAL HILL | 2210 GAVIOTA N AVE C | 7/6/2004 |
| LOS ANGELES | SOUTH GATE | 2634 PALM PLACE | 5/29/2007 |
| LOS ANGELES | SYLMAR | 12600 BRADLEY STREET | 7/19/2006 |
| LOS ANGELES | TORRANCE | 4111 PACIFIC COAST HIGHWAY 308 | 4/11/2004 |
| LOS ANGELES | VAN NUYS | 15149 DOMINO ST | 11/8/2005 |
| LOS ANGELES | VAN NUYS | 7400 SEPULVEDA BOULEVARD | 2/12/2008 |
| LOS ANGELES | WHITTIER | 8171 WASHINGTON AVE | 6/24/2004 |
| LOS ANGELES | WHITTIER | 6133 MCNEES AVE | 1/14/2006 |
| LOS ANGELES | WHITTIER | 10816 TOWNLEY DRIVE | 5/11/2007 |

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|---|---|---|---|
| LOS ANGELES | WILMINGTON | 1724 FRIES AVE | 2/17/2006 |
| LOS ANGELES | WILMINGTON | 1630 SANDISON STREET | 7/20/2007 |
| LOS ANGELES | WINNETKA | 8474 QUARTZ AVE | 9/28/2005 |
| MADERA | CHOWCHILLA | 18899 ROAD 16 | 4/28/2004 |
| MADERA | CHOWCHILLA | 1304 COLUSA AVE A | 1/25/2005 |
| MADERA | MADERA | 21442 AVENUE 19 AVE | 2/10/2005 |
| MADERA | MADERA | 815 EAST CLINTON AVENUE | 8/29/2006 |
| MADERA | MADERA | 18697 AVENUE PASS | 8/21/2007 |
| MADERA | MADERA | 512 FEIN STREET | 8/25/2007 |
| MADERA | MADERA | 35626 14 1/2 AVENUE | 2/1/2008 |
| MADERA | MADERA | 13577 20TH AVENUE | 9/4/2008 |
| MADERA | MADERA | 19184 AVE 18 | 5/15/2014 |
| MADERA | MADERA | 25816 Avenue 18 1/2 | 6/14/2016 |
| MADERA | MADERA | 11265 IOWA AV | 12/27/2017 |
| MENDOCINO | FORT BRAGG | 16900 FRANKLIN ROAD | 5/9/2006 |
| MENDOCINO | FORT BRAGG | 621 West St | 9/16/2016 |
| MENDOCINO | HOPLAND | 14410 Mountain House Rd | 9/21/2016 |
| MENDOCINO | PHILO | 3500 LITTLE MILL CREEK ROAD | 5/6/2010 |
| MENDOCINO | REDWOOD VALLEY | 9800 WEST ROAD | 4/9/2009 |
| MENDOCINO | WILLITS | 65000 SHERWOOD RIDGE ROAD | 2/20/2008 |
| MERCED | ATWATER | 9000 MORAN AVE | 5/11/2005 |
| MERCED | ATWATER | 1236 HULL RD | 9/23/2005 |
| MERCED | ATWATER | 1001 SANDPIPER WAY | 11/15/2006 |
| MERCED | ATWATER | 4146 SOUTH ELLIOTT ROAD | 8/11/2008 |
| MERCED | ATWATER | 2521 Boulder Dr | 9/21/2016 |
| MERCED | BALLICO | 11368 NORTH SANTA FE AVENUE | 1/10/2010 |
| MERCED | CRESSEY | 9835 CRESSEY | 6/3/2004 |
| MERCED | DELHI | 16235 REDBUD CT | 6/29/2004 |
| MERCED | DELHI | 8620 HINTON | 11/15/2006 |
| MERCED | DELHI | 15575 AUGUST AVENUE | 9/8/2008 |
| MERCED | DELHI | 9640 SANDS ROAD | 6/6/2010 |
| MERCED | GUSTINE | 8450 HIGHWAY 33 S HWY | 3/2/2005 |
| MERCED | HILMAR | 20295 AUGUST RD | 4/15/2004 |
| MERCED | HILMAR | 19511 WILLIAMS AVE | 10/13/2004 |
| MERCED | HILMAR | 250 N UNION | 10/12/2007 |
| MERCED | HILMAR | 19542 EAST FIRST STREET | 4/1/2010 |
| MERCED | LIVINGSTON | 5679 ARENA WAY | 4/6/2004 |
| MERCED | LIVINGSTON | 15290 SUNSET DRIVE | 5/22/2010 |
| MERCED | LOS BANOS | 313 J STREET | 8/11/2006 |
| MERCED | MERCED | 2536 LOBO | 2/4/2004 |
| MERCED | MERCED | 3613 N GARNER RD | 2/27/2004 |
| MERCED | MERCED | 321 S 59 S HWY | 1/3/2005 |
| MERCED | MERCED | 824 S FREYA | 1/25/2007 |
| MERCED | MERCED | 2499 EAST GERARD AVENUE | 3/21/2007 |
| MERCED | MERCED | 14717 EAST 272ND | 9/6/2007 |
| MERCED | MERCED | 5 WEST 25TH STREET 2 | 1/16/2008 |
| MERCED | SOUTH DOS PALOS | 8827 W K ST | 7/23/2004 |
| MERCED | STEVINSON | 18910 W 6TH ST | 2/10/2004 |
| MERCED | STEVINSON | 23875 SECOND AVENUE | 3/27/2006 |
| MERCED | STEVINSON | 2917 CEMETERY ROAD | 2/20/2008 |
| MERCED | STEVINSON | 2991 CEMETERY | 2/20/2008 |

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| MERCED | STEVINSON | 2228 NELANDER AVENUE | 4/27/2010 |
| MERCED | WINTON | 6280 CENTRAL AVE | 8/8/2004 |
| MERCED | WINTON | 9605 EUCALYPTUS AVE | 8/8/2004 |
| MERCED | WINTON | 7409 AMANDA DRIVE | 3/13/2007 |
| MERCED | WINTON | 6814 ARLENE WAY | 3/12/2008 |
| MERCED | WINTON | 7125 NORTH VINE AVENUE | 4/21/2010 |
| MERCED | WINTON | 7040 Myrtle AVENUE | 2/8/2016 |
| MONTEREY | GREENFIELD | 424 7TH AVENUE | 9/19/2010 |
| MONTEREY | PACIFIC GROVE | 316 PRESCOTT LN | 7/16/2004 |
| MONTEREY | SALINAS | 1769 YOSEMITE CIR | 5/21/2004 |
| MONTEREY | SALINAS | 1233 EAST POLK STREET | 6/20/2007 |
| MONTEREY | SALINAS | 18840 NORTHEAST EISENHOWERE D | 6/20/2007 |
| NEVADA | GRASS VALLEY | 439 NEAL ST 1 | 7/30/2004 |
| ORANGE | ANAHEIM | 131 MAGNOLIA AVENUE | 3/21/2008 |
| ORANGE | ANAHEIM | 3554 WEST CORNELIA CIRCLE | 3/24/2008 |
| ORANGE | ANAHEIM | 1819 CRIS | 3/27/2008 |
| ORANGE | ANAHEIM | 1261 PLACENTIA STREET | 3/29/2008 |
| ORANGE | ANAHEIM | 2500 EAST TERRACE STREET | 4/8/2008 |
| ORANGE | ANAHEIM | 622 VELARE AVENUE | 9/16/2008 |
| ORANGE | ANAHEIM | 1303 WEST MARLBORO AVENUE | 2/22/2010 |
| ORANGE | ANAHEIM | 10141 GRAVIER ST | 12/8/2017 |
| ORANGE | BREA | 2595 IMPERIAL HIGHWAY | 5/20/2010 |
| ORANGE | BUENA PARK | 7555 BEACH BLVD 128 | 2/10/2004 |
| ORANGE | BUENA PARK | 7111 BEACH BOULEVARD | 2/10/2010 |
| ORANGE | COSTA MESA | 929 JOANN STREET | 5/13/2008 |
| ORANGE | CYPRESS | 4812 GRACE AVENUE | 4/10/2006 |
| ORANGE | FULLERTON | 641 COMMONWEALTH AVENUE | 12/7/2007 |
| ORANGE | GARDEN GROVE | 8062 GARDEN GROVE BLVD 241 | 9/21/2004 |
| ORANGE | GARDEN GROVE | 9755 BIXBY AVENUE | 4/11/2008 |
| ORANGE | GARDEN GROVE | 10042 LAMPSON AVENUE | 5/13/2009 |
| ORANGE | GARDEN GROVE | 13691 BARNETT WAY | 2/13/2010 |
| ORANGE | HUNTINGTON BEACH | 8230 TALBERT | 4/7/2010 |
| ORANGE | IRVINE | 173 TOPEKA | 2/11/2004 |
| ORANGE | IRVINE | 87 PINESTONE | 3/23/2010 |
| ORANGE | LA HABRA | 2320 STORY AVE | 7/16/2004 |
| ORANGE | LA PALMA | 4761 SHARON DRIVE A | 7/17/2006 |
| ORANGE | LAGUNA BEACH | 985 PACIFIC COAST N HWY | 2/1/2004 |
| ORANGE | ORANGE | 2135 ALMOND W ST | 10/15/2004 |
| ORANGE | ORANGE | 207 ESPLANDE STREET | 5/30/2008 |
| ORANGE | ORANGE | 2300 NORTH TUSTIN AVENUE | 3/29/2010 |
| ORANGE | PLACENTIA | 745 DUNN | 3/16/2010 |
| ORANGE | SANTA ANA | 1137 MCFADDEN W | 7/7/2004 |
| ORANGE | SANTA ANA | 1233 GENOA S DR | 11/30/2004 |
| ORANGE | SANTA ANA | 1314 HARBOR BOULEVARD | 4/9/2008 |
| ORANGE | SANTA ANA | 3012 HALLADAY | 5/19/2008 |
| ORANGE | SANTA ANA | 412 BAKER STREET | 5/21/2008 |
| ORANGE | SANTA ANA | 702 SANTA ANA BOULEVARD | 7/14/2008 |
| ORANGE | SANTA ANA | 1450 AUTO DRIVE | 5/11/2009 |
| ORANGE | SANTA ANA | 4417 MORNINGSIDE | 4/28/2010 |
| ORANGE | SANTA ANA | 800 SOUTH SULLIVAN STREET D3 | 12/23/2011 |
| ORANGE | STANTON | 10698 COURT STREET | 9/15/2006 |

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| ORANGE | STANTON | 7701 WESTBROOK WAY | 4/19/2007 |
| ORANGE | TUSTIN | 13624 ESTERO CIR | 4/24/2004 |
| ORANGE | WESTMINSTER | 7681 BAYLOR DR | 7/15/2004 |
| ORANGE | WESTMINSTER | 9851 BOLSA AVENUE | 5/5/2006 |
| ORANGE | WESTMINSTER | 5051 PRINCETON AVENUE | 5/17/2006 |
| ORANGE | WESTMINSTER | 13100 GOLDENWEST STREET | 4/28/2009 |
| ORANGE | WESTMINSTER | 6942 GARDEN GROVE BOULEVARD | 5/21/2009 |
| ORANGE | YORBA LINDA | 5471 JEFFERSON STREET | 11/13/2007 |
| PLUMAS | CHESTER | 460 MELISSA AVENUE | 10/11/2007 |
| PLUMAS | PORTOLA | 5630 CASEY JONES ROAD | 4/14/2006 |
| PLUMAS | PORTOLA | 324 BELLA VISTA | 3/9/2010 |
| PLUMAS | QUINCY JUNCTION | 1426 BUTTERFLY VALLEY ROAD | 2/17/2010 |
| RIVERSIDE | ANZA | 57310 VALLEY VISTA | 6/11/2004 |
| RIVERSIDE | BANNING | 1007 LINDA VISTA RD | 10/26/2004 |
| RIVERSIDE | BANNING | 514 EAST VICTORY AVENUE | 3/21/2010 |
| RIVERSIDE | BEAUMONT | 34250 SAN TIMITEO CANYON RD | 4/15/2004 |
| RIVERSIDE | BEAUMONT | 1016 PALM AVE | 4/19/2004 |
| RIVERSIDE | CALIMESA | 9453 SHARONDALE ROAD | 6/8/2006 |
| RIVERSIDE | CATHEDRAL CITY | 68557 C STREET | 2/16/2004 |
| RIVERSIDE | COACHELLA | 731 Orchard St | 10/4/2016 |
| RIVERSIDE | CORONA | 734 VIEWTOP LN | 3/12/2004 |
| RIVERSIDE | CORONA | 995 POMONA RD 17 | 4/2/2004 |
| RIVERSIDE | CORONA | 1330 W 8TH ST 18 | 7/21/2004 |
| RIVERSIDE | CORONA | 446 FRANCIS E ST | 2/2/2006 |
| RIVERSIDE | CORONA | 379 EAST RANCHO ROAD | 1/2/2008 |
| RIVERSIDE | DESERT HOT SPRINGS | 66366 6TH ST | 1/20/2004 |
| RIVERSIDE | DESERT HOT SPRINGS | 13255 MEXQUITE AVENUE | 3/23/2006 |
| RIVERSIDE | DESERT HOT SPRINGS | 12155 OCOTILLO ROAD | 4/29/2009 |
| RIVERSIDE | EL CERRITO | 19078 RISING SUN RD | 3/12/2004 |
| RIVERSIDE | GLEN AVON HEIGHTS | 4080 CONNING | 2/29/2004 |
| RIVERSIDE | HEMET | 531 CEDAR LN 2 | 2/7/2004 |
| RIVERSIDE | HEMET | 1675 COBBLE LN | 2/11/2004 |
| RIVERSIDE | HEMET | 1097 N STATE ST 2 | 2/18/2004 |
| RIVERSIDE | HEMET | 772 N STATE | 3/24/2004 |
| RIVERSIDE | HEMET | 225 S ELK ST 36 | 3/30/2004 |
| RIVERSIDE | HEMET | 43939 FLORIDA AVE | 5/4/2004 |
| RIVERSIDE | HEMET | 585 S SANTA FE | 5/15/2004 |
| RIVERSIDE | HEMET | 2688 E FLORIDA AVE 18 | 6/4/2004 |
| RIVERSIDE | HEMET | 4400 FLORIDA W AVE 117 | 12/8/2004 |
| RIVERSIDE | HEMET | 41251 ROPE RD | 1/29/2005 |
| RIVERSIDE | HEMET | 525 GILBERT N 49 | 1/20/2006 |
| RIVERSIDE | HEMET | 25873 RIVERVIEW LANE | 3/15/2006 |
| RIVERSIDE | HEMET | 32809 RED MOUNTAIN ROAD | 2/18/2008 |
| RIVERSIDE | HEMET | 871 SAN MATEO CIRCLE | 5/21/2009 |
| RIVERSIDE | HEMET | 1610 BLUEJAY WAY | 3/2/2016 |
| RIVERSIDE | INDIO | 46540 PADUA CIR | 6/9/2004 |
| RIVERSIDE | INDIO | 47800 MADISON ST 169 | 9/21/2004 |
| RIVERSIDE | INDIO | 43430 Monroe St | 9/3/2016 |
| RIVERSIDE | LAKE ELSINORE | 17911 THORESON | 4/29/2004 |
| RIVERSIDE | LAKE ELSINORE | 34323 SUNRISE DRIVE | 1/27/2006 |
| RIVERSIDE | LAKE MATTHEWS | 17224 CAJON DR | 9/28/2004 |

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| RIVERSIDE | MENIFEE | 26814 MADERA CT | 12/6/2004 |
| RIVERSIDE | MIRA LOMA | 10351 OAK BARK LANE | 11/12/2008 |
| RIVERSIDE | MIRA LOMA | 12332 KERN RIVER DR | 12/6/2017 |
| RIVERSIDE | MORENO VALLEY | 25204 BRIDLE TRAIL | 8/29/2004 |
| RIVERSIDE | MORENO VALLEY | 16329 SADDLEBACK LANE | 2/3/2015 |
| RIVERSIDE | MORENO VALLEY | 25399 TODD DRIVE | 8/15/2015 |
| RIVERSIDE | MORENO VALLEY | 16329 Saddlebrook LANE | 2/9/2016 |
| RIVERSIDE | MOUNTAIN CENTER | 63137 JERABOA ROAD | 4/12/2007 |
| RIVERSIDE | NORCO | 2574 RIDGECREST | 3/16/2004 |
| RIVERSIDE | NORCO | 3117 SHADOW CANYON CIRCLE | 1/31/2008 |
| RIVERSIDE | NUEVO | 22788 VIA SANTANA | 4/21/2006 |
| RIVERSIDE | PALM SPRINGS | 383 VEREDA NORTE | 6/20/2008 |
| RIVERSIDE | PERRIS | 332 W 11TH ST | 2/8/2004 |
| RIVERSIDE | PERRIS | 143 PEROU ST | 6/27/2004 |
| RIVERSIDE | PERRIS | 618 BOND DR | 7/29/2004 |
| RIVERSIDE | PERRIS | 4715 WADE AVE | 3/3/2005 |
| RIVERSIDE | PERRIS | 19881 GUSTIN RD | 12/12/2005 |
| RIVERSIDE | PERRIS | 21747 WEBSTER AVENUE | 8/7/2008 |
| RIVERSIDE | PERRIS | 21881 OLEANDER AVENUE | 8/29/2008 |
| RIVERSIDE | PERRIS | 644 PRIMROSE PLACE | 4/8/2011 |
| RIVERSIDE | PERRIS | 2520 SPECTACULAR BID STREET | 7/29/2014 |
| RIVERSIDE | RIVERSIDE | 344 N STATE 148 | 1/28/2004 |
| RIVERSIDE | RIVERSIDE | 5861 MITCHELL | 3/31/2004 |
| RIVERSIDE | RIVERSIDE | 11235 CYPRESS | 6/27/2006 |
| RIVERSIDE | RIVERSIDE | 4080 PEDLEY ROAD | 2/5/2010 |
| RIVERSIDE | RIVERSIDE | 11744 HAZELDELL DRIVE | 4/2/2010 |
| RIVERSIDE | RIVERSIDE | 12172 SEVERN WAY | 4/2/2010 |
| RIVERSIDE | RIVERSIDE | 12172 SEVERN WAY | 4/2/2010 |
| RIVERSIDE | SAN JACINTO | 437 MEAD | 8/2/2004 |
| RIVERSIDE | SAN JACINTO | 344 N STATE ST SP 196 | 6/15/2005 |
| RIVERSIDE | SAN JACINTO | 610 WASHINGTON E AVE | 2/22/2006 |
| RIVERSIDE | SAN JACINTO | 182 DE ANZA | 4/20/2006 |
| RIVERSIDE | TEMECULA | 29774 CALLE PANTANO | 2/2/2010 |
| RIVERSIDE | TEMECULA | 30984 LOLITA RD | 12/7/2017 |
| RIVERSIDE | VICTORVILLE | 20197 NANDINA AVE | 7/9/2004 |
| RIVERSIDE | VICTORVILLE | 22875 RIOS | 11/16/2004 |
| RIVERSIDE | WINCHESTER | 33091 WILLARD | 5/20/2004 |
| SACRAMENTO | CITRUS HEIGHTS | 7401 LOVATO | 6/23/2007 |
| SACRAMENTO | ELK GROVE | 5354 JADE CREEK | 2/23/2005 |
| SACRAMENTO | ELVERTA | 2495 RHINE WAY | 8/5/2004 |
| SACRAMENTO | ELVERTA | 2110 QUAIL RANCH COURT | 2/28/2006 |
| SACRAMENTO | GALT | 132 4TH | 4/20/2010 |
| SACRAMENTO | RANCHO CORDOVA | 10892 WALNUTWOOD WAY | 4/4/2004 |
| SACRAMENTO | SACRAMENTO | 4405 23RD ST | 2/4/2004 |
| SACRAMENTO | SACRAMENTO | 4719 HAYFORD WAY | 2/24/2004 |
| SACRAMENTO | SACRAMENTO | 7624 BIRDIE CT | 3/23/2004 |
| SACRAMENTO | SACRAMENTO | 1536 STRADER AVE | 3/26/2004 |
| SACRAMENTO | SACRAMENTO | 5867 AUBURN BLVD 30 | 3/30/2004 |
| SACRAMENTO | SACRAMENTO | 2530 STREET S 8 | 4/1/2004 |
| SACRAMENTO | SACRAMENTO | 3534 SUMMER PARK DR 354 | 10/8/2004 |
| SACRAMENTO | SACRAMENTO | 4144 CABINET CIRCLE | 3/6/2006 |

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| SACRAMENTO | SACRAMENTO | 7662 COUNTRY PARK DRIVE | 6/6/2006 |
| SACRAMENTO | SACRAMENTO | 5230 PALM | 1/30/2007 |
| SACRAMENTO | SACRAMENTO | 2681 FAIRFIELD STREET | 2/13/2007 |
| SACRAMENTO | SACRAMENTO | 6316 WELTY WAY | 12/3/2008 |
| SACRAMENTO | | 5140 W SHERMAN ISLAND ROAD | 5/13/2006 |
| SAN BERNARDINO | ADELANTO | 17526 KEATS ROAD | 11/29/2007 |
| SAN BERNARDINO | APPLE VALLEY | 21845 ARAPAHOE ST 1 | 2/17/2004 |
| SAN BERNARDINO | APPLE VALLEY | 10620 MATILIJA | 5/21/2004 |
| SAN BERNARDINO | APPLE VALLEY | 10808 MILLS RD | 6/2/2004 |
| SAN BERNARDINO | APPLE VALLEY | 12618 POCONO ROAD | 10/15/2006 |
| SAN BERNARDINO | APPLE VALLEY | 20024 HAPPY TRAILS HIGHWAY | 1/4/2007 |
| SAN BERNARDINO | APPLE VALLEY | 9611 NAVAJO ROAD | 5/5/2009 |
| SAN BERNARDINO | BAKER | 71759 BAKER BLVD | 4/16/2004 |
| SAN BERNARDINO | BARSTOW | 24966 CAMINO DEL SOL ST | 6/7/2004 |
| SAN BERNARDINO | BARSTOW | 2577 COMMUNITY BLVD | 9/18/2004 |
| SAN BERNARDINO | BARSTOW | 29779 N 1ST | 11/18/2004 |
| SAN BERNARDINO | BARSTOW | 434 S SECOND ST 1 | 1/1/2005 |
| SAN BERNARDINO | BLOOMINGTON | 16742 14TH ST | 11/17/2004 |
| SAN BERNARDINO | CHINO | 11838 CENTRAL AVE 93 | 2/11/2004 |
| SAN BERNARDINO | CHINO | 12018 CENTRAL AVE | 5/13/2004 |
| SAN BERNARDINO | CHINO HILLS | 15553 ESTHER ST | 12/13/2004 |
| SAN BERNARDINO | COLTON | 1822 ADMIRALTY STREET | 6/15/2007 |
| SAN BERNARDINO | FONTANA | 14430 SANTA ANA | 1/15/2004 |
| SAN BERNARDINO | FONTANA | 13519 ARROW RT | 3/30/2004 |
| SAN BERNARDINO | FONTANA | 7642 KEMPSTER AVE | 9/7/2004 |
| SAN BERNARDINO | FONTANA | 17265 LURELANE STREET | 3/20/2006 |
| SAN BERNARDINO | FONTANA | 13449 IVY | 6/15/2006 |
| SAN BERNARDINO | FONTANA | 14349 FIGWOOD DRIVE | 12/13/2006 |
| SAN BERNARDINO | FONTANA | 16411 ATHOL STREET | 4/17/2008 |
| SAN BERNARDINO | HESPERIA | 14926 FIR ST | 2/25/2004 |
| SAN BERNARDINO | HESPERIA | 15356 PENDLETON | 6/16/2004 |
| SAN BERNARDINO | HESPERIA | 11976 MARIPOSA RD | 7/3/2004 |
| SAN BERNARDINO | HESPERIA | 7892 ALSTON | 10/1/2004 |
| SAN BERNARDINO | HESPERIA | 10721 MAPLE ST | 7/29/2005 |
| SAN BERNARDINO | HESPERIA | 9553 LOS BANOS AVE | 1/12/2006 |
| SAN BERNARDINO | HESPERIA | 11516 HAWTHORNE | 3/25/2006 |
| SAN BERNARDINO | HESPERIA | 9393 HICKORY | 6/8/2006 |
| SAN BERNARDINO | HESPERIA | 10983 4TH AVENUE | 6/9/2006 |
| SAN BERNARDINO | HESPERIA | 13010 PRAIRIE TRAIL | 2/22/2007 |
| SAN BERNARDINO | HESPERIA | 9519 MAPLE AVENUE | 10/18/2008 |
| SAN BERNARDINO | HIGHLAND | 7409 LOS FELIZ DR | 4/23/2004 |
| SAN BERNARDINO | HIGHLAND | 25715 LIME ST | 5/18/2004 |
| SAN BERNARDINO | HIGHLAND | 28457 MERRION AVE | 5/21/2004 |
| SAN BERNARDINO | HINKLEY | 23572 STATE HIGHWAY 58 | 4/5/2009 |
| SAN BERNARDINO | JOSHUA TREE | 62475 COVE LN | 5/27/2004 |
| SAN BERNARDINO | JOSHUA TREE | 3255 SUNSET RD | 9/26/2004 |
| SAN BERNARDINO | JOSHUA TREE | 8997 TORTUGA ROAD | 1/14/2008 |
| SAN BERNARDINO | LANDERS | 57646 LINN ROAD | 10/14/2008 |
| SAN BERNARDINO | LOMA LINDA | 26232 NEWPORT AVENUE | 8/1/2006 |
| SAN BERNARDINO | MUSCOY | 2544 3RD ST | 6/23/2004 |
| SAN BERNARDINO | NEWBERRY SPRINGS | 52875 BEDFORD RD | 3/25/2004 |

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| SAN BERNARDINO | NEWBERRY SPRINGS | 47962 HORNER RD | 6/24/2004 |
| SAN BERNARDINO | NEWBERRY SPRINGS | 35377 NEWBERRY RD | 10/11/2004 |
| SAN BERNARDINO | NEWBERRY SPRINGS | 42378 SILVER VALLEY ROAD | 4/21/2006 |
| SAN BERNARDINO | ONTARIO | 844 WYSTERIA E CT | 1/21/2004 |
| SAN BERNARDINO | ONTARIO | 1506 E HIGHLAND CT | 7/26/2004 |
| SAN BERNARDINO | ONTARIO | 956 PRINCETON W ST | 2/10/2006 |
| SAN BERNARDINO | ONTARIO | 740 CAMALOT | 9/10/2007 |
| SAN BERNARDINO | ORO GRANDE | 21451 NATIONAL TRAILS HIGHWAY | 6/13/2006 |
| SAN BERNARDINO | PHELAN | 8135 JOSHUA ST | 4/27/2004 |
| SAN BERNARDINO | PHELAN | 6721 NIELSON RD | 9/17/2004 |
| SAN BERNARDINO | PHELAN | 11480 MACRON | 10/19/2004 |
| SAN BERNARDINO | PINON HILLS | 11475 PRADO ROAD | 3/27/2007 |
| SAN BERNARDINO | RANCHO CUCAMONGA | 7651 EFFEN | 10/1/2004 |
| SAN BERNARDINO | REDLANDS | 1034 ALTA ST | 1/28/2004 |
| SAN BERNARDINO | REDLANDS | 28565 SAN TIMOTEO CANYON | 10/25/2004 |
| SAN BERNARDINO | REDLANDS | 2155 CITRUS AVE 112 | 2/14/2005 |
| SAN BERNARDINO | REDLANDS | 828 6TH STREET | 3/23/2006 |
| SAN BERNARDINO | REDLANDS | 511 REDLANDS BOULEVARD | 5/16/2007 |
| SAN BERNARDINO | RIALTO | 349 N LILAC | 2/17/2004 |
| SAN BERNARDINO | RIALTO | 624 ETIWANDA AVENUE | 12/22/2007 |
| SAN BERNARDINO | SAN BERNARDINO | 1443 CEDAR 23 | 3/9/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 1443 CEDAR ST 1 | 4/9/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 3160 N STATE ST | 4/23/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 2176 AMANDA ST | 5/21/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 1162 E 2ND | 11/16/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 2547 3RD AVE | 12/28/2004 |
| SAN BERNARDINO | SAN BERNARDINO | 123 E 11TH ST | 1/19/2005 |
| SAN BERNARDINO | SAN BERNARDINO | 1318 E GOULD ST | 1/22/2005 |
| SAN BERNARDINO | SAN BERNARDINO | 11571 5TH ST | 8/29/2005 |
| SAN BERNARDINO | SAN BERNARDINO | 2131 GENEVIEVE STREET | 3/10/2006 |
| SAN BERNARDINO | SAN BERNARDINO | 756 W 19 ST | 3/16/2006 |
| SAN BERNARDINO | SAN BERNARDINO | 19829 KENDALL DRIVE | 9/12/2006 |
| SAN BERNARDINO | SAN BERNARDINO | 2292 PORTOLA STREET | 10/13/2006 |
| SAN BERNARDINO | SAN BERNARDINO | 243 MERIDIAN AVENUE | 7/18/2007 |
| SAN BERNARDINO | SAN BERNARDINO | 223 49TH | 11/7/2007 |
| SAN BERNARDINO | SAN BERNARDINO | 1431 7TH STREET | 11/26/2007 |
| SAN BERNARDINO | SAN BERNARDINO | 6317 BONNIE STREET | 4/3/2008 |
| SAN BERNARDINO | SAN BERNARDINO | 7234 DWIGHT WAY | 7/1/2008 |
| SAN BERNARDINO | SAN BERNARDINO | 205 WEST BENEDICT ROAD | 4/2/2010 |
| SAN BERNARDINO | TRONA | 13860 FREMONT ST 2 | 12/30/2004 |
| SAN BERNARDINO | TWENTYNINE PALMS | 4828 LEAR AVE | 2/22/2004 |
| SAN BERNARDINO | TWENTYNINE PALMS | 7580 MAC RD | 3/31/2004 |
| SAN BERNARDINO | TWENTYNINE PALMS | 5665 AERONIA | 4/15/2004 |
| SAN BERNARDINO | TWENTYNINE PALMS | 68077 INDIAN TRAIL | 6/16/2004 |
| SAN BERNARDINO | UPLAND | 359 SEVENTH ST | 1/5/2005 |
| SAN BERNARDINO | VICTORVILLE | 16717 C ST | 1/30/2004 |
| SAN BERNARDINO | VICTORVILLE | 16868 STODDARD WELLS RD | 2/19/2004 |
| SAN BERNARDINO | VICTORVILLE | 15330 CONDOR RD | 3/9/2004 |
| SAN BERNARDINO | VICTORVILLE | 17053 B ST | 10/19/2004 |
| SAN BERNARDINO | VICTORVILLE | 16688 HUGHES | 10/21/2004 |
| SAN BERNARDINO | VICTORVILLE | 16262 YUCCA AVE | 8/1/2005 |

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| SAN BERNARDINO | VICTORVILLE | 11550 WHITE RD | 10/17/2005 |
| SAN BERNARDINO | VICTORVILLE | 13126 MESA | 2/7/2006 |
| SAN BERNARDINO | VICTORVILLE | 16755 UNION ST B | 2/24/2006 |
| SAN BERNARDINO | VICTORVILLE | 15618 TOPANGO ROAD | 3/2/2006 |
| SAN BERNARDINO | VICTORVILLE | 13602 NASSAU DRIVE | 3/15/2006 |
| SAN BERNARDINO | VICTORVILLE | 14349 HESPERIA ROAD | 12/21/2006 |
| SAN BERNARDINO | VICTORVILLE | 13852 BURNING TREE LANE | 5/3/2007 |
| SAN BERNARDINO | VICTORVILLE | 16753 ZENDA STREET | 8/6/2007 |
| SAN BERNARDINO | VICTORVILLE | 13143 SLEEPY RIDGE LANE | 3/5/2010 |
| SAN BERNARDINO | YERMO | 37933 GRANDVIEW AVENUE | 8/10/2006 |
| SAN BERNARDINO | YUCAIPA | 12470 15TH ST | 5/25/2005 |
| SAN BERNARDINO | YUCCA VALLEY | 58620 SAN MARINO DRIVE | 9/6/2006 |
| SAN DIEGO | ALPINE | 404 SUMMERHILL TERRACE | 12/2/2013 |
| SAN DIEGO | BOULEVARD | 2605 PASEO ALTA CT | 1/7/2004 |
| SAN DIEGO | CARLSBAD | 382 ACACIA | 8/8/2010 |
| SAN DIEGO | CARLSBAD | 847 LAGUNA | 8/8/2010 |
| SAN DIEGO | ESCONDIDO | 1306 RONDA AVE | 3/23/2004 |
| SAN DIEGO | ESCONDIDO | 431 4TH E AVE 1B | 8/31/2004 |
| SAN DIEGO | ESCONDIDO | 16975 GUEJITO RD | 3/3/2005 |
| SAN DIEGO | ESCONDIDO | 1825 EAST VALLEY WAY | 6/6/2006 |
| SAN DIEGO | ESCONDIDO JUNCTION | 1531 MONTIEL | 1/20/2010 |
| SAN DIEGO | FALLBROOK | 422 CATALPA LN | 5/19/2004 |
| SAN DIEGO | LA PUENTE | 1254 BANNON | 5/10/2007 |
| SAN DIEGO | LAKESIDE | 11441 EL NOPAL | 8/12/2004 |
| SAN DIEGO | OCEANSIDE | 3965 BROWN STREET | 9/20/2006 |
| SAN DIEGO | SAN DIEGO | 875 HOTEL S CIR | 1/30/2004 |
| SAN DIEGO | SAN DIEGO | 6173 FAUNA DRIVE | 5/21/2004 |
| SAN DIEGO | SAN DIEGO | 4242 34TH ST D | 9/16/2004 |
| SAN DIEGO | SAN DIEGO | 3835 MIDWAY #203 DRIVE | 6/20/2007 |
| SAN DIEGO | SAN DIEGO | 9777 DE LA AMISTAD VIADUCT | 6/12/2009 |
| SAN DIEGO | SAN YSIDRO | 905 HWY CALIENTE RD | 1/16/2004 |
| SAN DIEGO | SANTEE | 8593 MAGNOLIA AVE | 1/30/2004 |
| SAN DIEGO | VALLEY CENTER | 30118 MILLER ROAD | 11/7/2008 |
| SAN DIEGO | VISTA | 1280 HACIENDA DR G6 | 11/24/2004 |
| SAN DIEGO | VISTA | 1710 AVOCADO DRIVE | 9/14/2006 |
| SAN DIEGO | VISTA | 663 EUCALYPTUS | 4/3/2007 |
| SAN DIEGO | VISTA | 526 MAR VISTA DRIVE | 11/29/2007 |
| SAN DIEGO | VISTA | 1610 N SANTA FE | 4/9/2008 |
| SAN FRANCISCO | SAN FRANCISCO | 35 BELVEDERE ST 5 | 3/29/2006 |
| SAN JOAQUIN | LATHROP | 15523 SIXTH STREET | 10/11/2007 |
| SAN JOAQUIN | MANTECA | 481 SOUTH UNION ROAD | 4/20/2007 |
| SAN JOAQUIN | MANTECA | 250 N UNION | 10/12/2007 |
| SAN JOAQUIN | STOCKTON | 7790 N ASHLEY LN | 1/20/2004 |
| SAN JOAQUIN | STOCKTON | 9800 E EIGHT MILE RD | 4/16/2004 |
| SAN JOAQUIN | STOCKTON | 5708 N HIGHWAY 99 | 4/18/2004 |
| SAN JOAQUIN | STOCKTON | 1560 SILVER CREEK | 4/22/2004 |
| SAN JOAQUIN | STOCKTON | 10285 HILDRETH LN | 6/30/2004 |
| SAN JOAQUIN | STOCKTON | 2717 W MARCH LN | 7/31/2004 |
| SAN JOAQUIN | STOCKTON | 2654 W MARCH LN 304 | 8/4/2004 |
| SAN JOAQUIN | STOCKTON | 3416 FARMINGTON E RD 2 | 8/26/2004 |
| SAN JOAQUIN | STOCKTON | 2274 E FREMONT | 9/25/2004 |

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|---|---|---|---|
| SAN JOAQUIN | STOCKTON | 2071 LA JOLLA DR | 4/25/2005 |
| SAN JOAQUIN | STOCKTON | 2553 MICHAELANGELO DRIVE | 6/1/2006 |
| SAN JOAQUIN | STOCKTON | 301 MORADA | 4/19/2007 |
| SAN JOAQUIN | TRACY | 14703 FINCK ROAD | 8/3/2006 |
| SAN JOAQUIN | TRACY | 11422 WEST LARCH ROAD | 3/14/2008 |
| SAN LUIS OBISPO | ATASCADERO | 1400 SAN RAMON | 1/5/2004 |
| SAN LUIS OBISPO | ATASCADERO | 4080 DOLORES AVENUE | 3/14/2006 |
| SAN LUIS OBISPO | GROVER BEACH | 448 NORTH 9TH STREET | 3/30/2006 |
| SAN LUIS OBISPO | MORRO BAY | 525 ATASCADERO ROAD | 7/12/2006 |
| SAN LUIS OBISPO | NIPOMO | 155 EAST PRICE STREET | 4/29/2008 |
| SAN LUIS OBISPO | PASO ROBLES | 749 ORCHARD | 9/5/2006 |
| SAN LUIS OBISPO | PASO ROBLES | 512 FEIN STREET | 8/25/2007 |
| SAN LUIS OBISPO | SAN LUIS OBISPO | 3500 BULLOCK | 8/29/2006 |
| SAN LUIS OBISPO | SAN LUIS OBISPO | 1771 CORDOVA | 12/7/2011 |
| SAN LUIS OBISPO | TEMPLETON | 30 DANELION ROAD | 1/15/2007 |
| SAN MATEO | BELMONT | 926 SOUTH ROAD | 6/21/2006 |
| SAN MATEO | DALY CITY | 439 BONNIE STREET | 1/14/2010 |
| SAN MATEO | EAST PALO ALTO | 1894 BAY ROAD | 6/4/2006 |
| SANTA CLARA | CAMPBELL | 768 NEVINS STREET | 7/11/2007 |
| SANTA CLARA | GILROY | 7860 DRIFTWOOD TER A | 4/3/2004 |
| SANTA CLARA | GILROY | 2250 ROOP RD ROAD | 8/19/2010 |
| SANTA CLARA | LOS ALTOS | 25562 FERNHILL DR | 10/26/2004 |
| SANTA CLARA | MORGAN HILL | 6760 CROY RD | 9/29/2004 |
| SANTA CLARA | SAN JOSE | 3570 COLUMBINE DR | 1/15/2004 |
| SANTA CLARA | SAN JOSE | 110 ROUNDTABLE DR 1 | 2/8/2004 |
| SANTA CLARA | SAN JOSE | 1374 RANDOL AVE | 5/5/2004 |
| SANTA CLARA | SAN JOSE | 90 SADDLEBROOK DR | 6/22/2004 |
| SANTA CLARA | SAN JOSE | 935 FOXCHASE DR 413 | 9/21/2004 |
| SANTA CLARA | SAN JOSE | 2251 LANSFORD AVE | 11/15/2004 |
| SANTA CLARA | SAN JOSE | 1425 STAHL ST | 10/16/2005 |
| SANTA CLARA | SAN JOSE | 1560 DARLENE AVE | 1/24/2006 |
| SANTA CLARA | SAN JOSE | 1919 FRUITDALE AVENUE | 5/11/2006 |
| SANTA CLARA | SAN JOSE | 4075 HOBART AVENUE | 4/27/2007 |
| SANTA CLARA | SAN JOSE | 2475 GLEN ANGUS WAY | 2/21/2008 |
| SANTA CLARA | SAN JOSE | 843 SPINDRIFT WAY | 3/18/2008 |
| SANTA CLARA | SAN JOSE | 1480 DOUGLAS STREET | 3/20/2008 |
| SANTA CLARA | SAN JOSE | 71 AVENIDA ESPANA | 5/29/2008 |
| SANTA CLARA | SAN JOSE | 973 IDLEWOOD DRIVE | 8/31/2008 |
| SANTA CLARA | SAN JOSE | 800 SARATOGA AVENUE A308 | 6/10/2010 |
| SANTA CLARA | SAN JOSE | 5674 SAN FELIPE ROAD | 8/26/2010 |
| SANTA CLARA | SAN JOSE | 315 N 21ST STREET | 9/18/2015 |
| SANTA CLARA | SANTA CLARA | 1232 WARBURTON AVE | 6/8/2004 |
| SANTA CLARA | SANTA CLARA | 2597 BORAX DRIVE | 2/22/2008 |
| SANTA CLARA | SANTA CLARA | 2147 NEWHALL STREET | 3/9/2011 |
| SANTA CLARA | SANTA CLARA | 930 El Camino Real | 5/19/2016 |
| SANTA CRUZ | CAPITOLA | 1066 41ST AVENUE | 9/12/2010 |
| SANTA CRUZ | SANTA CRUZ | 911 SOQUEL AVE | 3/18/2005 |
| SANTA CRUZ | SANTA CRUZ | 231 FELIX STREET | 5/2/2006 |
| SANTA CRUZ | SANTA CRUZ | 870 17TH AVENUE | 9/29/2006 |
| SANTA CRUZ | SANTA CRUZ | 15769 COMSTOCK MILL ROAD | 3/13/2008 |
| SANTA CRUZ | SOQUEL | 2600 41ST ST | 8/12/2004 |

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|---|---|---|---|
| SANTA CRUZ | WATSONVILLE | 216 SILVERLEAF DRIVE | 10/17/2007 |
| SHASTA | ANDERSON | 6465 SADDLE TRAIL RD | 7/29/2004 |
| SHASTA | IGO | 14463 WINDWALKER LN | 3/27/2006 |
| SHASTA | REDDING | 1420 ARIZONA STREET | 2/2/2004 |
| SHASTA | REDDING | 781 S STREET | 3/21/2004 |
| SHASTA | REDDING | 12691 WILLIAMSON RD | 3/30/2004 |
| SHASTA | REDDING | 80 CHURN CREEK RD | 7/18/2005 |
| SHASTA | REDDING | 3115 STRATFORD AVENUE | 9/19/2006 |
| SHASTA | REDDING | 1571 COLLEGE VIEW DRIVE | 8/29/2007 |
| SHASTA | REDDING | 13922A SUNDUST ROAD | 3/11/2010 |
| SHASTA | SHINGLETOWN | 7498 HILDA RD | 4/13/2006 |
| SISKIYOU | DORRIS | 2100 SHEEPY ISLAND RD 437 | 3/3/2004 |
| SISKIYOU | WEED | 208 JACKSON ST | 2/21/2004 |
| SISKIYOU | WEED | 208 JACKSON ST | 3/16/2004 |
| SISKIYOU | WEED | 208 JACKSON ST | 7/21/2005 |
| SOLANO | DIXON | 805 N ADAMS ST 110 | 3/23/2004 |
| SOLANO | DIXON | 9155 OLMO RD | 3/3/2006 |
| SOLANO | SUISUN CITY | 515 CRESTED DR | 3/9/2005 |
| SOLANO | VACAVILLE | 7234 SHELTON LN | 9/29/2005 |
| SOLANO | VACAVILLE | 148 LOMITA AVENUE | 3/5/2008 |
| SOLANO | VALLEJO | 1130 MONTEREY ST | 2/12/2004 |
| SOLANO | VALLEJO | 1163 LEWIS AVE | 3/30/2004 |
| SOLANO | VALLEJO | 618 MAIN ST | 4/20/2004 |
| SOLANO | VALLEJO | 136 HOGAN ST | 5/14/2004 |
| SOLANO | VALLEJO | 318 TAPER AVENUE | 1/31/2008 |
| SOLANO | VALLEJO | 264 FLYINGCLOUD COURT | 4/30/2010 |
| STANISLAUS | CERES | 4837 FAITH HOME RD 119 | 1/1/2004 |
| STANISLAUS | CERES | 4022 ESMAIL KEYES | 7/2/2004 |
| STANISLAUS | CERES | 2033 HACKETT RD | 1/18/2005 |
| STANISLAUS | CERES | 527 MITCHELL RD | 3/22/2006 |
| STANISLAUS | CERES | 3707 MONTE VISTA E AVE | 3/24/2006 |
| STANISLAUS | CERES | 1743 CENTRAL | 10/20/2006 |
| STANISLAUS | CERES | 112 TAYLOR ROAD | 8/25/2008 |
| STANISLAUS | CERES | 1948 EVANS ROAD | 11/16/2008 |
| STANISLAUS | CERES | 1528 EVANS ROAD | 11/18/2008 |
| STANISLAUS | CERES | 3107 TAYLOR ROAD | 5/19/2009 |
| STANISLAUS | CERES | 3107 EAST TAYLOR ROAD | 5/19/2009 |
| STANISLAUS | CERES | 2329 6TH STREET | 2/5/2010 |
| STANISLAUS | DENAIR | 5319 BERKELEY AVE | 9/19/2004 |
| STANISLAUS | DENAIR | 4540 ARNOLD RD | 2/2/2005 |
| STANISLAUS | DENAIR | 18000 KEYES ROAD | 4/14/2009 |
| STANISLAUS | GRAYSON | 1705 HITO DR | 4/7/2005 |
| STANISLAUS | HICKMAN | 948 HICKMAN RD | 1/20/2004 |
| STANISLAUS | HICKMAN | 861 MEIER ROAD | 6/19/2008 |
| STANISLAUS | HUGHSON | 1828 WHITE BIRTCH DRIVE | 8/28/2011 |
| STANISLAUS | MODESTO | 3356 MAZE W BLVD | 1/17/2004 |
| STANISLAUS | MODESTO | 1520 PROSPECT LN | 1/24/2004 |
| STANISLAUS | MODESTO | 1312 MCHENRY 111 | 7/13/2004 |
| STANISLAUS | MODESTO | 2009 MONTICELLO AVE | 7/13/2004 |
| STANISLAUS | MODESTO | 1516 BOLLINGER CT | 9/1/2004 |
| STANISLAUS | MODESTO | 1240 N 9TH ST 10 | 9/5/2004 |

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|---|---|---|---|
| STANISLAUS | MODESTO | 8100 YOSEMITE BLVD | 10/3/2004 |
| STANISLAUS | MODESTO | 3708 ALMERIA DR | 12/11/2004 |
| STANISLAUS | MODESTO | 400 ALGEN AVE | 2/2/2005 |
| STANISLAUS | MODESTO | 1022 CALDER CT | 3/26/2005 |
| STANISLAUS | MODESTO | 205 GLACIER AVE | 1/18/2006 |
| STANISLAUS | MODESTO | 3500 PLAIN VIEW ROAD | 3/7/2006 |
| STANISLAUS | MODESTO | 1411 SCENIC DRIVE | 4/24/2006 |
| STANISLAUS | MODESTO | 110 WISENOR | 5/18/2006 |
| STANISLAUS | MODESTO | 2008 STRACKER WAY | 6/8/2006 |
| STANISLAUS | MODESTO | 620 PARADISE ROAD | 9/13/2006 |
| STANISLAUS | MODESTO | 306 LOCUST STREET | 9/14/2006 |
| STANISLAUS | MODESTO | 665 7TH STREET | 12/4/2006 |
| STANISLAUS | MODESTO | 1331 PARADISE ROAD | 6/3/2007 |
| STANISLAUS | MODESTO | 1016 EAST MARLOW | 6/19/2008 |
| STANISLAUS | MODESTO | 1016 MARLOW | 6/19/2008 |
| STANISLAUS | MODESTO | 1898 SKYLANE WAY | 5/21/2009 |
| STANISLAUS | MODESTO | 1600 FRENCH | 8/11/2011 |
| STANISLAUS | MODESTO | 1749 POLAND | 2/9/2012 |
| STANISLAUS | NEWMAN | 531 LADY SLIPPER | 1/15/2008 |
| STANISLAUS | NEWMAN | 1200 MAIN STREET | 7/26/2010 |
| STANISLAUS | OAKDALE | 143 N 6TH ST | 1/5/2004 |
| STANISLAUS | OAKDALE | 13537 ORANGE BLOSSOM RD | 10/22/2004 |
| STANISLAUS | OAKDALE | 410 ARBOLES WAY | 10/26/2004 |
| STANISLAUS | OAKDALE | 755 RIVER AVE | 11/29/2004 |
| STANISLAUS | OAKDALE | 445 N FIFTH | 12/6/2004 |
| STANISLAUS | OAKDALE | 20601 WARNERVILLE ROAD | 5/28/2009 |
| STANISLAUS | OAKDALE | 10742 PIONEER AVENUE | 6/30/2009 |
| STANISLAUS | PATTERSON | 1830 ORANGE AVENUE | 5/3/2009 |
| STANISLAUS | RIVERBANK | 3939 MINNIEAR AVE | 1/31/2006 |
| STANISLAUS | RIVERBANK | 2924 STANISLAUS STREET | 6/18/2009 |
| STANISLAUS | RIVERBANK | 3238 POCKET AVENUE | 5/22/2010 |
| STANISLAUS | STANISLAUS | 13660 CARPENTER RD | 2/7/2004 |
| STANISLAUS | TURLOCK | 6407 MITCHELL RD | 4/12/2004 |
| STANISLAUS | TURLOCK | 1625 LARKSPUR ST | 6/29/2004 |
| STANISLAUS | TURLOCK | 265 IRONWOOD | 10/30/2004 |
| STANISLAUS | TURLOCK | 357 E OLIVE AVE | 11/4/2004 |
| STANISLAUS | TURLOCK | 201 G STREET | 6/26/2007 |
| STANISLAUS | TURLOCK | 1105 BEREA | 9/15/2007 |
| STANISLAUS | TURLOCK | 1090 DENAIR AVENUE | 1/6/2008 |
| STANISLAUS | TURLOCK | 1125 SOUTH TEGNER ROAD A | 2/16/2008 |
| STANISLAUS | TURLOCK | 3800 CROWELL ROAD | 4/18/2008 |
| STANISLAUS | TURLOCK | 590 MINARET AVENUE | 8/5/2008 |
| STANISLAUS | TURLOCK | 677 NORTH SODERQUIST ROAD | 12/15/2008 |
| STANISLAUS | TURLOCK | 4519 MOFFETT ROAD | 4/22/2009 |
| STANISLAUS | TURLOCK | 6107 MOUNTAIN VIEW ROAD | 5/19/2009 |
| STANISLAUS | TURLOCK | 460 MOFFET ROAD | 5/29/2009 |
| STANISLAUS | TURLOCK | 1180 WEST LINWOOD AVENUE | 2/9/2010 |
| STANISLAUS | WATERFORD | 575 E ST | 3/5/2004 |
| SUTTER | LIVE OAK | 2691 STAFFORD DR | 11/10/2004 |
| SUTTER | LIVE OAK | 9755 O ST | 4/7/2005 |
| SUTTER | SUTTER | 2235 MADRONE ST | 5/17/2004 |
| SUTTER | YUBA CITY | 2898 MCKENLY RD | 1/11/2004 |

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|---|---|---|---|
| SUTTER | YUBA CITY | 1400 LYTLE RD | 2/17/2004 |
| SUTTER | YUBA CITY | 1718 ELMER RD | 3/10/2004 |
| SUTTER | YUBA CITY | 1292 HARTER RD | 5/11/2004 |
| SUTTER | YUBA CITY | 1619 FRANKLIN RD K | 6/7/2004 |
| SUTTER | YUBA CITY | 1081 NORTHRIDGE DR | 9/1/2004 |
| SUTTER | YUBA CITY | 400 WALTON N AVE 3 | 9/2/2004 |
| SUTTER | YUBA CITY | 761 CHESTNUT ST | 10/18/2004 |
| SUTTER | YUBA CITY | 413 PINE ST | 10/30/2004 |
| SUTTER | YUBA CITY | 1368 HUTCHINSON A | 11/5/2004 |
| SUTTER | YUBA CITY | 24 CENTRAL AVE | 12/11/2004 |
| SUTTER | YUBA CITY | 132 S WALTON AVE A | 12/22/2004 |
| SUTTER | YUBA CITY | 1587 GRAY AVE | 2/15/2005 |
| SUTTER | YUBA CITY | 1341 DUSTIN DR 39 | 9/1/2005 |
| SUTTER | YUBA CITY | 4098 MARLETTE RD | 1/23/2006 |
| SUTTER | YUBA CITY | 1115 MARCIA AVENUE | 2/18/2006 |
| SUTTER | YUBA CITY | 1250 KENNY DRIVE | 5/19/2006 |
| SUTTER | YUBA CITY | 617 FORBES AVENUE | 1/2/2007 |
| TEHAMA | CORNING | 6330 PIEDMONT RD | 9/27/2004 |
| TEHAMA | CORNING | 323 RIO DEL REY COURT | 7/31/2006 |
| TEHAMA | LOS MOLINOS | 24881 68TH | 4/28/2010 |
| TEHAMA | RED BLUFF | 19932 SAWTOOTH DRIVE | 8/1/2006 |
| TRINITY | TRINITY CENTER | 360 MAUDE AVENUE | 3/11/2007 |
| TULARE | CUTLER | 39500 ROAD 136 | 4/28/2006 |
| TULARE | DINUBA | 39780 ROAD 56 | 3/31/2004 |
| TULARE | DINUBA | 38929 ROAD 84 | 8/17/2006 |
| TULARE | LINDSAY | 1445 E HONOLULU | 3/24/2004 |
| TULARE | PORTERVILLE | 27003 AVENUE 120 | 2/7/2004 |
| TULARE | PORTERVILLE | 1611 E SUCCESS DRIVE | 1/7/2006 |
| TULARE | PORTERVILLE | 670 E POPLAR | 1/7/2006 |
| TULARE | TIPTON | 14144 ROAD 152 | 8/9/2006 |
| TULARE | TULARE | 26442 99 HWY 210 | 5/26/2004 |
| TULARE | WOODVILLE | 16477 HUDSON AVE | 1/29/2004 |
| VENTURA | FILLMORE | 2989 WEST W TELEGRAPH ROAD HIC | 6/14/2006 |
| VENTURA | N/A | 5892 SANTA CLARA RD | 2/22/2006 |
| VENTURA | OXNARD | 765 KOHALA STREET | 11/9/2006 |
| VENTURA | THOUSAND OAKS | 982 EAST JANAS ROAD | 3/20/2007 |
| VENTURA | VENTURA | 1300 SARATOGA STREET | 5/4/2006 |
| YOLO | WEST SACRAMENTO | 1155 LINDEN RD | 1/13/2004 |
| YOLO | WEST SACRAMENTO | 1900 EVERGREEN AVENUE | 3/30/2007 |
| YOLO | WOODLAND | 1730 DONNER WAY | 3/10/2004 |
| YUBA | ARBOGA | 13814 CHARLIES LN | 5/27/2004 |
| YUBA | LOMA RICA | 5124 WOLF TRAIL | 1/25/2006 |
| YUBA | MARYSVILLE | 1118 I ST | 4/6/2004 |
| YUBA | MARYSVILLE | 1205 E 22ND ST | 4/12/2004 |
| YUBA | MARYSVILLE | 222 H ST | 4/14/2004 |
| YUBA | MARYSVILLE | 1804 HILE AVE C | 5/12/2004 |
| YUBA | MARYSVILLE | 1505 RAMIREZ RD | 5/20/2004 |
| YUBA | MARYSVILLE | 5956 PARK AVE O | 7/18/2004 |
| YUBA | MARYSVILLE | 5818 PARK AVE | 8/3/2004 |
| YUBA | MARYSVILLE | 5931 REDBURN AVE | 8/8/2004 |
| YUBA | MARYSVILLE | 1735 N BEALE RD | 9/10/2004 |

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|---|---|---|---|
| YUBA | MARYSVILLE | 2209 BOULTON WAY | 10/18/2004 |
| YUBA | MARYSVILLE | 976 KAY ST | 10/25/2004 |
| YUBA | MARYSVILLE | 5395 FEATHER RIVER BLVD | 12/21/2004 |
| YUBA | MARYSVILLE | 5528 ALICIA AVE | 2/22/2005 |
| YUBA | MARYSVILLE | 5696 ARBOGA RD | 3/9/2005 |
| YUBA | MARYSVILLE | 1100 E 17TH ST 36 | 5/18/2005 |
| YUBA | MARYSVILLE | 885 GRAND AVE | 5/24/2005 |
| YUBA | MARYSVILLE | 209 E ST | 12/13/2005 |
| YUBA | MARYSVILLE | 1097 VINE AVE | 1/12/2006 |
| YUBA | MARYSVILLE | 647 RAMIREZ RD B | 2/16/2006 |
| YUBA | MARYSVILLE | 714 BOYER ROAD | 3/30/2006 |
| YUBA | MARYSVILLE | 5514 FEATHER RIVER BOULEVARD | 7/13/2006 |
| YUBA | MARYSVILLE | 8369 HWY 70 | 10/3/2006 |
| YUBA | MARYSVILLE | 7340 DOC ADAMS ROAD | 10/9/2006 |
| YUBA | MARYSVILLE | 1164 REDWOOD AVENUE | 6/11/2007 |
| YUBA | MARYSVILLE | 4499 EAST ERLE ROAD | 7/7/2007 |
| YUBA | OLIVEHURST | 3735 ARBOGA RD | 9/27/2004 |
| YUBA | OLIVEHURST | 4456 COLLEGE | 9/28/2004 |
| YUBA | OLIVEHURST | 1941 14TH ST | 11/3/2004 |
| YUBA | OLIVEHURST | 4461 COLLEGE WAY | 11/17/2004 |
| YUBA | OLIVEHURST | 1696 10TH AVE | 1/27/2005 |
| YUBA | OLIVEHURST | 1440 BROADWAY RD | 1/17/2006 |
| YUBA | OLIVEHURST | 3948 SHIMER RD | 1/31/2006 |
| YUBA | OLIVEHURST | 4605 SUMMERS LN | 1/31/2006 |

# APPENDIX C

## PHOTOGRAPHS

# PHOTOGRAPHS
## APN's 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



1. View east from near western portion of Site.

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**2. View north from near western portion of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**3. View northwest from near western portion of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**4. View east along southern portion of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**5. View north from near central portion of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**6. View west of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**7. View east of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**8. View west of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**9. View west of Site.**

GEOTEK

# PHOTOGRAPHS
## APNs 1045-121-02 and 1045-151-34
## Upland, San Bernardino County, California



**10. View east of Site.**

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# APPENDIX D

## ENVIRONMENTAL DATABASE REPORT

GEOTEK

**Upland Site**
East 15th Street/North 13th Avenue
Upland, CA 91786

Inquiry Number: 5331724.2s
June 14, 2018

# The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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with any questions or comments.


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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

## TARGET PROPERTY INFORMATION

### ADDRESS

EAST 15TH STREET/NORTH 13TH AVENUE
UPLAND, CA 91786

### COORDINATES

| | |
|---|---|
| Latitude (North): | 34.1188060 - 34° 7' 7.70'' |
| Longitude (West): | 117.6326940 - 117° 37' 57.69'' |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 441651.8 |
| UTM Y (Meters): | 3775315.0 |
| Elevation: | 1430 ft. above sea level |

## USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

| | |
|---|---|
| Target Property Map: | 5619074 ONTARIO, CA |
| Version Date: | 2012 |
| Northeast Map: | 5630609 CUCAMONGA PEAK, CA |
| Version Date: | 2012 |
| Southeast Map: | 5620426 GUASTI, CA |
| Version Date: | 2012 |
| Northwest Map: | 5630625 MOUNT BALDY, CA |
| Version Date: | 2012 |

## AERIAL PHOTOGRAPHY IN THIS REPORT

| | |
|---|---|
| Portions of Photo from: | 20140527, 20140603 |
| Source: | USDA |

## MAPPED SITES SUMMARY

Target Property Address:
EAST 15TH STREET/NORTH 13TH AVENUE
UPLAND, CA 91786

Click on Map ID to see full detail.

| MAP ID | SITE NAME | ADDRESS | DATABASE ACRONYMS | RELATIVE ELEVATION | DIST (ft. & mi.) DIRECTION |
|---|---|---|---|---|---|
| 1 | IEUA GROUNDWATER REC | | CIWQS | Lower | 1 ft. |
| 2 | EQUITY EXPRESS INC | 1485 GROVE AVE | EDR Hist Auto | Lower | 379, 0.072, ESE |
| 3 | PREMIER DRY CLEANING | 1469 N 13TH AVE | EDR Hist Cleaner | Lower | 455, 0.086, SSW |
| 4 | GAS PUMP EXCHANGE LL | 1040 SAWTOOTH DR | EDR Hist Auto | Lower | 460, 0.087, West |
| A5 | UPLAND HILLS COUNTRY | 1231 E 016TH ST | SWEEPS UST, CA FID UST | Higher | 984, 0.186, North |
| A6 | UPLAND HILLS COUNTRY | 1231 16TH ST | LUST | Higher | 984, 0.186, North |
| A7 | UPLAND HILLS COUNTRY | 1231 E 16TH ST | LUST, HIST UST, San Bern. Co. Permit | Higher | 984, 0.186, North |
| A8 | UPLAND HILLS COUNTRY | 1231 E. 16TH ST | AST | Higher | 984, 0.186, North |
| 9 | LANDFILLUPLAND-CLOSE | 870 E 15TH ST | WMUDS/SWAT, WDS | Lower | 1099, 0.208, West |
| 10 | CITY OF UPLAND DISPO | OFF CAMPUS AVENUE BE | SWF/LF | Lower | 1724, 0.327, WSW |

# EXECUTIVE SUMMARY

## TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

## DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

## STANDARD ENVIRONMENTAL RECORDS

### *Federal NPL site list*

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

### *Federal Delisted NPL site list*

Delisted NPL ---------- National Priority List Deletions

### *Federal CERCLIS list*

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

### *Federal CERCLIS NFRAP site list*

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

### *Federal RCRA CORRACTS facilities list*

CORRACTS ---------- Corrective Action Report

### *Federal RCRA non-CORRACTS TSD facilities list*

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

### *Federal RCRA generators list*

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

### *Federal institutional controls / engineering controls registries*

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List

US INST CONTROL ---------- Sites with Institutional Controls

***Federal ERNS list***

ERNS ---------- Emergency Response Notification System

***State- and tribal - equivalent NPL***

RESPONSE ---------- State Response Sites

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR ---------- EnviroStor Database

***State and tribal leaking storage tank lists***

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land
CPS-SLIC ---------- Statewide SLIC Cases

***State and tribal registered storage tank lists***

FEMA UST ---------- Underground Storage Tank Listing
UST ---------- Active UST Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land

***State and tribal voluntary cleanup sites***

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

***State and tribal Brownfields sites***

BROWNFIELDS ---------- Considered Brownfieds Sites Listing

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS ---------- A Listing of Brownfields Sites

***Local Lists of Landfill / Solid Waste Disposal Sites***

SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
ODI ---------- Open Dump Inventory
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program

CDL ---- Clandestine Drug Labs
Toxic Pits ---- Toxic Pits Cleanup Act Sites
US CDL ---- National Clandestine Laboratory Register
CERS HAZ WASTE ---- CERS HAZ WASTE

***Local Lists of Registered Storage Tanks***

CERS TANKS ---- California Environmental Reporting System (CERS) Tanks

***Local Land Records***

LIENS ---- Environmental Liens Listing
LIENS 2 ---- CERCLA Lien Information
DEED ---- Deed Restriction Listing

***Records of Emergency Release Reports***

HMIRS ---- Hazardous Materials Information Reporting System
CHMIRS ---- California Hazardous Material Incident Report System
LDS ---- Land Disposal Sites Listing
MCS ---- Military Cleanup Sites Listing
SPILLS 90 ---- SPILLS 90 data from FirstSearch

***Other Ascertainable Records***

RCRA NonGen / NLR ---- RCRA - Non Generators / No Longer Regulated
FUDS ---- Formerly Used Defense Sites
DOD ---- Department of Defense Sites
SCRD DRYCLEANERS ---- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---- Financial Assurance Information
EPA WATCH LIST ---- EPA WATCH LIST
2020 COR ACTION ---- 2020 Corrective Action Program List
TSCA ---- Toxic Substances Control Act
TRIS ---- Toxic Chemical Release Inventory System
SSTS ---- Section 7 Tracking Systems
ROD ---- Records Of Decision
RMP ---- Risk Management Plans
RAATS ---- RCRA Administrative Action Tracking System
PRP ---- Potentially Responsible Parties
PADS ---- PCB Activity Database System
ICIS ---- Integrated Compliance Information System
FTTS ---- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---- Material Licensing Tracking System
COAL ASH DOE ---- Steam-Electric Plant Operation Data
COAL ASH EPA ---- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---- PCB Transformer Registration Database
RADINFO ---- Radiation Information Database
HIST FTTS ---- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---- Incident and Accident Data
CONSENT ---- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---- Indian Reservations
FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites

| | |
|---|---|
| US AIRS | Aerometric Information Retrieval System Facility Subsystem |
| US MINES | Mines Master Index File |
| ABANDONED MINES | Abandoned Mines |
| FINDS | Facility Index System/Facility Registry System |
| DOCKET HWC | Hazardous Waste Compliance Docket Listing |
| UXO | Unexploded Ordnance Sites |
| ECHO | Enforcement & Compliance History Information |
| FUELS PROGRAM | EPA Fuels Program Registered Listing |
| CA BOND EXP. PLAN | Bond Expenditure Plan |
| Cortese | "Cortese" Hazardous Waste & Substances Sites List |
| CUPA Listings | CUPA Resources List |
| DRYCLEANERS | Cleaner Facilities |
| EMI | Emissions Inventory Data |
| ENF | Enforcement Action Listing |
| Financial Assurance | Financial Assurance Information Listing |
| HAZNET | Facility and Manifest Data |
| ICE | ICE |
| HIST CORTESE | Hazardous Waste & Substance Site List |
| HWP | EnviroStor Permitted Facilities Listing |
| HWT | Registered Hazardous Waste Transporter Database |
| MINES | Mines Site Location Listing |
| MWMP | Medical Waste Management Program Listing |
| NPDES | NPDES Permits Listing |
| PEST LIC | Pesticide Regulation Licenses Listing |
| PROC | Certified Processors Database |
| Notify 65 | Proposition 65 Records |
| UIC | UIC Listing |
| WASTEWATER PITS | Oil Wastewater Pits Listing |
| WDS | Waste Discharge System |
| WIP | Well Investigation Program Case List |
| CERS | CERS |
| UIC GEO | UIC GEO (GEOTRACKER) |
| WELL STIM PROJ | Well Stimulation Project (GEOTRACKER) |
| SAMPLING POINT | SAMPLING POINT (GEOTRACKER) |
| PROJECT | PROJECT (GEOTRACKER) |
| PROD WATER PONDS | PROD WATER PONDS (GEOTRACKER) |
| OTHER OIL GAS | OTHER OIL & GAS (GEOTRACKER) |
| NON-CASE INFO | NON-CASE INFO (GEOTRACKER) |
| MILITARY PRIV SITES | MILITARY PRIV SITES (GEOTRACKER) |

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

| | |
|---|---|
| EDR MGP | EDR Proprietary Manufactured Gas Plants |

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

| | |
|---|---|
| RGA LF | Recovered Government Archive Solid Waste Facilities List |
| RGA LUST | Recovered Government Archive Leaking Underground Storage Tank |

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

# EXECUTIVE SUMMARY

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there is 1 SWF/LF site within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| CITY OF UPLAND DISPO | OFF CAMPUS AVENUE BE | WSW 1/4 - 1/2 (0.327 mi.) | 10 | 16 |
| Database: SWF/LF (SWIS), Date of Government Version: 02/12/2018 | | | | |
| Facility ID: 36-AA-0005 | | | | |
| Operational Status: Closed | | | | |
| Regulation Status: Unpermitted | | | | |

***State and tribal leaking storage tank lists***

LUST: Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the LUST list, as provided by EDR, has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| UPLAND HILLS COUNTRY | 1231 16TH ST | N 1/8 - 1/4 (0.186 mi.) | A6 | 10 |
| Database: LUST REG 8, Date of Government Version: 02/14/2005 | | | | |
| Facility Status: Preliminary site assessment underway | | | | |
| Global ID: T0607100394 | | | | |
| ***UPLAND HILLS COUNTRY*** | ***1231 E 16TH ST*** | ***N 1/8 - 1/4 (0.186 mi.)*** | ***A7*** | ***11*** |
| Database: LUST, Date of Government Version: 03/12/2018 | | | | |
| Status: Completed - Case Closed | | | | |
| Global Id: T0607100394 | | | | |

***State and tribal registered storage tank lists***

AST: A listing of aboveground storage tank petroleum storage tank locations.

A review of the AST list, as provided by EDR, has revealed that there is 1 AST site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| UPLAND HILLS COUNTRY | 1231 E. 16TH ST | N 1/8 - 1/4 (0.186 mi.) | A8 | 13 |
| Database: AST, Date of Government Version: 07/06/2016 | | | | |

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Lists of Landfill / Solid Waste Disposal Sites***

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, and dated 04/01/2000 has revealed that there is 1 WMUDS/SWAT site within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***LANDFILLUPLAND-CLOSE*** | ***870 E 15TH ST*** | ***W 1/8 - 1/4 (0.208 mi.)*** | ***9*** | ***14*** |

***Local Lists of Registered Storage Tanks***

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there is 1 SWEEPS UST site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***UPLAND HILLS COUNTRY*** | ***1231 E 016TH ST*** | ***N 1/8 - 1/4 (0.186 mi.)*** | ***A5*** | ***9*** |
| Status: A | | | | |
| Tank Status: A | | | | |
| Comp Number: 57116 | | | | |

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***UPLAND HILLS COUNTRY*** | ***1231 E 16TH ST*** | ***N 1/8 - 1/4 (0.186 mi.)*** | ***A7*** | ***11*** |

Facility Id: 00000057116

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there is 1 CA FID UST site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***UPLAND HILLS COUNTRY*** | ***1231 E 016TH ST*** | ***N 1/8 - 1/4 (0.186 mi.)*** | ***A5*** | ***9*** |
| Facility Id: 36009162 | | | | |
| Status: A | | | | |

***Other Ascertainable Records***

San Bern. Co. Permit: San Bernardino County Fire Department Hazardous Materials Division.

A review of the San Bern. Co. Permit list, as provided by EDR, and dated 11/30/2017 has revealed that there is 1 San Bern. Co. Permit site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***UPLAND HILLS COUNTRY*** | ***1231 E 16TH ST*** | ***N 1/8 - 1/4 (0.186 mi.)*** | ***A7*** | ***11*** |
| Facility Status: ACTIVE | | | | |
| Facility Id: FA0006955 | | | | |

CIWQS: The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

A review of the CIWQS list, as provided by EDR, and dated 03/05/2018 has revealed that there is 1 CIWQS site within approximately 0.001 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| IEUA GROUNDWATER REC | | 0 - 1/8 (0.000 mi.) | 1 | 8 |

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

EDR Hist Auto: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station,

service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Auto list, as provided by EDR, has revealed that there are 2 EDR Hist Auto sites within approximately 0.125 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| EQUITY EXPRESS INC | 1485 GROVE AVE | ESE 0 - 1/8 (0.072 mi.) | 2 | 8 |
| GAS PUMP EXCHANGE LL | 1040 SAWTOOTH DR | W 0 - 1/8 (0.087 mi.) | 4 | 9 |

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property.

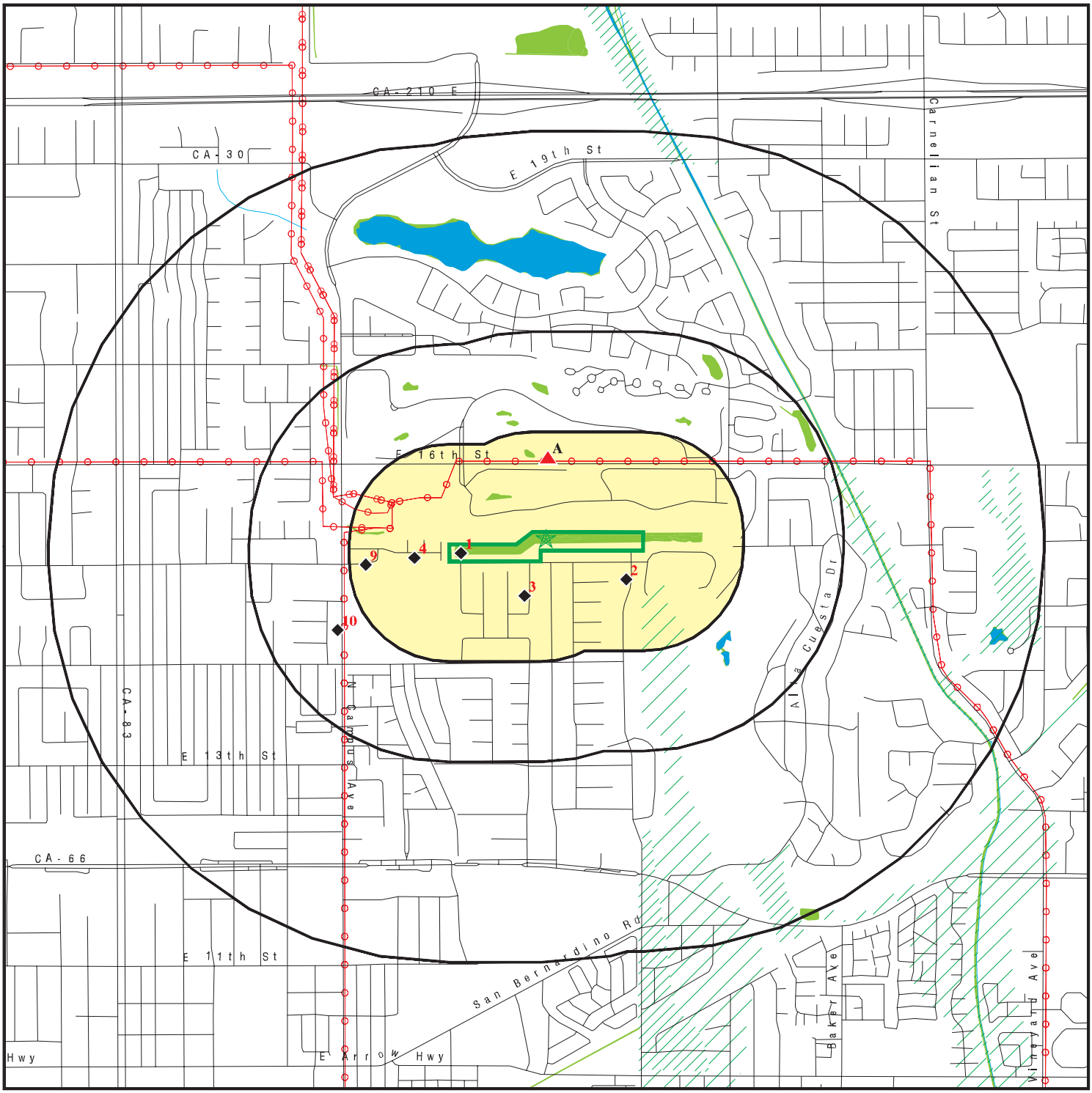
| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| PREMIER DRY CLEANING | 1469 N 13TH AVE | SSW 0 - 1/8 (0.086 mi.) | 3 | 8 |

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 7 records.

| Site Name | Database(s) |
|---|---|
| UPLAND INTERCEPTOR RELIEF SEWER PH | CIWQS |
| UPLAND LANDFILL | FINDS |
| UPLAND LANDFILL | FINDS |
| CITY OF UPLAND SANITARY LANDFILL S | ODI |
| UPLAND CITY, POLICE DEPT | EMI |
| CITY OF UPLAND DISPOSAL SITE | RGA LF |
| CITY OF UPLAND DISPOSAL SITE | RGA LF |

# OVERVIEW MAP - 5331724.2S




- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Upland Site | CLIENT: Geotek |
| ADDRESS: East 15th Street/North 13th Avenue<br>Upland CA 91786 | CONTACT: Anna M. Scott |
| LAT/LONG: 34.118806 / 117.632694 | INQUIRY #: 5331724.2s<br>DATE: June 14, 2018 12:48 pm |

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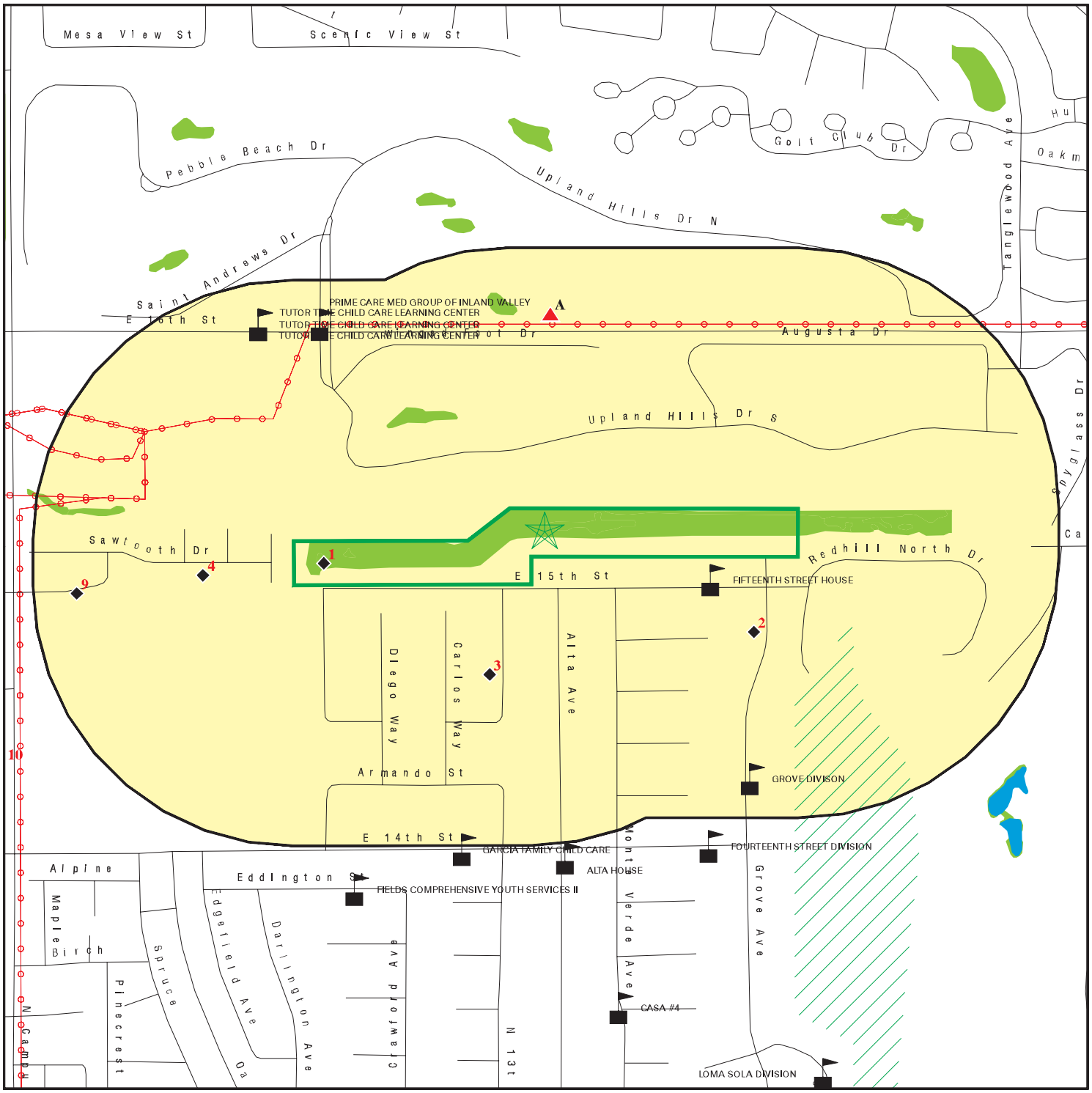
# DETAIL MAP - 5331724.2S




0 1/8 1/4 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Upland Site | CLIENT: Geotek |
| ADDRESS: East 15th Street/North 13th Avenue<br>Upland CA 91786 | CONTACT: Anna M. Scott<br>INQUIRY #: 5331724.2s |
| LAT/LONG: 34.118806 / 117.632694 | DATE: June 14, 2018 12:53 pm |

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# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **STANDARD ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Federal NPL site list*** | | | | | | | | |
| NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| NPL LIENS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ***Federal Delisted NPL site list*** | | | | | | | | |
| Delisted NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS list*** | | | | | | | | |
| FEDERAL FACILITY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| SEMS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal CERCLIS NFRAP site list*** | | | | | | | | |
| SEMS-ARCHIVE | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | | | |
| CORRACTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA non-CORRACTS TSD facilities list*** | | | | | | | | |
| RCRA-TSDF | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA generators list*** | | | | | | | | |
| RCRA-LQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| RCRA-SQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| RCRA-CESQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| LUCIS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US ENG CONTROLS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US INST CONTROL | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal ERNS list*** | | | | | | | | |
| ERNS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ***State- and tribal - equivalent NPL*** | | | | | | | | |
| RESPONSE | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State- and tribal - equivalent CERCLIS*** | | | | | | | | |
| ENVIROSTOR | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | 0.500 | | 0 | 0 | 1 | NR | NR | 1 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| LUST | 0.500 | | 0 | 2 | 0 | NR | NR | 2 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| INDIAN LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| CPS-SLIC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| FEMA UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| AST | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| INDIAN UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| INDIAN VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***State and tribal Brownfields sites*** | | | | | | | | |
| BROWNFIELDS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| **ADDITIONAL ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Local Brownfield lists*** | | | | | | | | |
| US BROWNFIELDS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Landfill / Solid Waste Disposal Sites*** | | | | | | | | |
| WMUDS/SWAT | 0.500 | | 0 | 1 | 0 | NR | NR | 1 |
| SWRCY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HAULERS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| INDIAN ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| DEBRIS REGION 9 | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| IHS OPEN DUMPS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US HIST CDL | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| HIST Cal-Sites | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCH | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| CDL | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| Toxic Pits | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US CDL | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| CERS HAZ WASTE | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Local Lists of Registered Storage Tanks*** | | | | | | | | |
| SWEEPS UST | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| HIST UST | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| CA FID UST | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| CERS TANKS | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| LIENS 2 | 0.001 | | 0 | NR | NR | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| DEED | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| CHMIRS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| LDS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| MCS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| SPILLS 90 | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA NonGen / NLR | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| FUDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DOD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCRD DRYCLEANERS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US FIN ASSUR | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| EPA WATCH LIST | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| 2020 COR ACTION | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| TSCA | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| TRIS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| SSTS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ROD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RMP | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| RAATS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| PRP | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| PADS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ICIS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| FTTS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| MLTS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| COAL ASH DOE | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| COAL ASH EPA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| PCB TRANSFORMER | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| RADINFO | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| HIST FTTS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| DOT OPS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| CONSENT | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN RESERV | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| FUSRAP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| LEAD SMELTERS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| US AIRS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| US MINES | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ABANDONED MINES | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| FINDS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| DOCKET HWC | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| UXO | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ECHO | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| FUELS PROGRAM | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| CA BOND EXP. PLAN | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Cortese | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| CUPA Listings | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| DRYCLEANERS | 0.250 | | 0 | 0 | NR | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| EMI | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ENF | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| Financial Assurance | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| HAZNET | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| ICE | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| HIST CORTESE | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HWP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| HWT | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| MINES | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| MWMP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| NPDES | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| San Bern. Co. Permit | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| PEST LIC | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| PROC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| Notify 65 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UIC | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| WASTEWATER PITS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| WDS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| WIP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| CERS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| UIC GEO | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| WELL STIM PROJ | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| SAMPLING POINT | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| CIWQS | 0.001 | | 1 | NR | NR | NR | NR | 1 |
| PROJECT | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| PROD WATER PONDS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| OTHER OIL GAS | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| NON-CASE INFO | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| MILITARY PRIV SITES | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| **EDR HIGH RISK HISTORICAL RECORDS** | | | | | | | | |
| ***EDR Exclusive Records*** | | | | | | | | |
| EDR MGP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| EDR Hist Auto | 0.125 | | 2 | NR | NR | NR | NR | 2 |
| EDR Hist Cleaner | 0.125 | | 1 | NR | NR | NR | NR | 1 |
| **EDR RECOVERED GOVERNMENT ARCHIVES** | | | | | | | | |
| ***Exclusive Recovered Govt. Archives*** | | | | | | | | |
| RGA LF | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| RGA LUST | 0.001 | | 0 | NR | NR | NR | NR | 0 |
| - Totals -- | | 0 | 4 | 8 | 1 | 0 | 0 | 13 |

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

**1** **IEUA GROUNDWATER RECHARGE BASIN OPERATIONS AND MAI** **CIWQS** **S121645815**
**N/A**

**< 1/8** **UPLAND, CA 91786**
**1 ft.**

**Relative: Lower**

**Actual: 1429 ft.**

CIWQS:

| | |
|---|---|
| Agency: | Inland Empire Utilities Agency |
| Agency Address: | Po Box 9020, Chino Hills, CA 91709 |
| Place/Project Type: | Dredge/Fill Site |
| SIC/NAICS: | Not reported |
| Region: | 8 |
| Program: | CERFILLEXC |
| Regulatory Measure Status: | Active |
| Regulatory Measure Type: | 401 Certification |
| Order Number: | Not reported |
| WDID: | 362016-11 |
| NPDES Number: | Not reported |
| Adoption Date: | 02/13/2018 |
| Effective Date: | 02/13/2018 |
| Termination Date: | Not reported |
| Expiration/Review Date: | 12/31/2027 |
| Design Flow: | Not reported |
| Major/Minor: | Not reported |
| Complexity: | Not reported |
| TTWQ: | Not reported |
| Enforcement Actions within 5 years: | 0 |
| Violations within 5 years: | 0 |
| Latitude: | 34.118333 |
| Longitude: | -117.636389 |

---

**2** **EQUITY EXPRESS INC** **EDR Hist Auto** **1022213278**
**ESE** **1485 GROVE AVE** **N/A**
**< 1/8** **UPLAND, CA 91786**
**0.072 mi.**
**379 ft.**

**Relative: Lower**

**Actual: 1411 ft.**

EDR Hist Auto

| Year: | Name: | Type: |
|---|---|---|
| 1998 | EQUITY EXPRESS INC | Gasoline Service Stations, NEC |

---

**3** **PREMIER DRY CLEANING** **EDR Hist Cleaner** **1020065912**
**SSW** **1469 N 13TH AVE** **N/A**
**< 1/8** **UPLAND, CA 91786**
**0.086 mi.**
**455 ft.**

**Relative: Lower**

**Actual: 1412 ft.**

EDR Hist Cleaner

| Year: | Name: | Type: |
|---|---|---|
| 2004 | PREMIER DRY CLEANING | Drycleaning Plants, Except Rugs |
| 2005 | PREMIER DRY CLEANING | Drycleaning Plants, Except Rugs |
| 2006 | PREMIER DRY CLEANING | Drycleaning Plants, Except Rugs |
| 2007 | PREMIER DRY CLEANING | Drycleaning Plants, Except Rugs |
| 2008 | PREMIER DRY CLEANING | Drycleaning Plants, Except Rugs |

**4**
**West**
**< 1/8**
**0.087 mi.**
**460 ft.**

**GAS PUMP EXCHANGE LLC**
**1040 SAWTOOTH DR**
**UPLAND, CA 91786**

**EDR Hist Auto** **1021877208**
**N/A**

**Relative:**
**Lower**

**Actual:**
**1426 ft.**

EDR Hist Auto

| Year: | Name: | Type: |
|---|---|---|
| 2010 | GAS PUMP EXCHANGE LLC | Gasoline Service Stations, NEC |
| 2011 | GAS PUMP EXCHANGE LLC | Gasoline Service Stations, NEC |
| 2013 | GAS PUMP EXCHANGE LLC | Gasoline Service Stations, NEC |
| 2014 | GAS PUMP EXCHANGE LLC | Gasoline Service Stations, NEC |

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**A5**
**North**
**1/8-1/4**
**0.186 mi.**
**984 ft.**

**UPLAND HILLS COUNTRY CLUB**
**1231 E 016TH ST**
**UPLAND, CA 91786**

**Site 1 of 4 in cluster A**

**SWEEPS UST** **S101619086**
**CA FID UST** **N/A**

**Relative:**
**Higher**

**Actual:**
**1472 ft.**

SWEEPS UST:

| | |
|---|---|
| Status: | Active |
| Comp Number: | 57116 |
| Number: | 9 |
| Board Of Equalization: | 44-021248 |
| Referral Date: | 08-30-88 |
| Action Date: | 08-30-88 |
| Created Date: | 02-29-88 |
| Owner Tank Id: | 1 |
| SWRCB Tank Id: | 36-000-057116-000001 |
| Tank Status: | A |
| Capacity: | 2000 |
| Active Date: | 08-30-88 |
| Tank Use: | UNKNOWN |
| STG: | P |
| Content: | Not reported |
| Number Of Tanks: | 2 |

| | |
|---|---|
| Status: | Active |
| Comp Number: | 57116 |
| Number: | 9 |
| Board Of Equalization: | 44-021248 |
| Referral Date: | 08-30-88 |
| Action Date: | 08-30-88 |
| Created Date: | 02-29-88 |
| Owner Tank Id: | 2 |
| SWRCB Tank Id: | 36-000-057116-000002 |
| Tank Status: | A |
| Capacity: | 1 |
| Active Date: | 08-30-88 |
| Tank Use: | UNKNOWN |
| STG: | P |
| Content: | UNKNOWN |
| Number Of Tanks: | Not reported |

CA FID UST:

| | |
|---|---|
| Facility ID: | 36009162 |
| Regulated By: | UTNKA |
| Regulated ID: | 00057116 |

**UPLAND HILLS COUNTRY CLUB (Continued)** **S101619086**

| | |
|---|---|
| Cortese Code: | Not reported |
| SIC Code: | Not reported |
| Facility Phone: | Not reported |
| Mail To: | Not reported |
| Mailing Address: | 1231 E 16TH ST |
| Mailing Address 2: | Not reported |
| Mailing City,St,Zip: | UPLAND 91786 |
| Contact: | Not reported |
| Contact Phone: | Not reported |
| DUNs Number: | Not reported |
| NPDES Number: | Not reported |
| EPA ID: | Not reported |
| Comments: | Not reported |
| Status: | Active |

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**A6** **UPLAND HILLS COUNTRY CLUB** **LUST** **S102440451**
**North** **1231 16TH ST** **N/A**
**1/8-1/4** **UPLAND, CA 95047**
**0.186 mi.**
**984 ft.** **Site 2 of 4 in cluster A**

**Relative:** LUST REG 8:
**Higher**

**Actual:**
**1472 ft.**

| | |
|---|---|
| Region: | 8 |
| County: | San Bernardino |
| Regional Board: | Santa Ana Region |
| Facility Status: | Preliminary site assessment underway |
| Case Number: | 083602731T |
| Local Case Num: | 95047 |
| Case Type: | Soil only |
| Substance: | Diesel |
| Qty Leaked: | Not reported |
| Abate Method: | Not reported |
| Cross Street: | TANGLEWOOD |
| Enf Type: | CLOS |
| Funding: | Not reported |
| How Discovered: | OM |
| How Stopped: | Not reported |
| Leak Cause: | UNK |
| Leak Source: | Piping |
| Global ID: | T0607100394 |
| How Stopped Date: | 10/6/1995 |
| Enter Date: | 12/14/1995 |
| Date Confirmation of Leak Began: | Not reported |
| Date Preliminary Assessment Began: | 1/1/1965 |
| Discover Date: | 9/15/1995 |
| Enforcement Date: | Not reported |
| Close Date: | 10/23/1998 |
| Date Prelim Assessment Workplan Submitted: | Not reported |
| Date Pollution Characterization Began: | Not reported |
| Date Remediation Plan Submitted: | Not reported |
| Date Remedial Action Underway: | Not reported |
| Date Post Remedial Action Monitoring: | Not reported |
| Enter Date: | 12/14/1995 |
| GW Qualifies: | Not reported |
| Soil Qualifies: | Not reported |
| Operator: | Not reported |
| Facility Contact: | Not reported |
| Interim: | Not reported |

**UPLAND HILLS COUNTRY CLUB (Continued)** **S102440451**

| | |
|---|---|
| Oversite Program: | LUST |
| Latitude: | 34.1210983 |
| Longitude: | -117.6411056 |
| MTBE Date: | Not reported |
| Max MTBE GW: | Not reported |
| MTBE Concentration: | 0 |
| Max MTBE Soil: | Not reported |
| MTBE Fuel: | 0 |
| MTBE Tested: | Not Required to be Tested. |
| MTBE Class: | * |
| Staff: | CAB |
| Staff Initials: | LH6 |
| Lead Agency: | Local Agency |
| Local Agency: | 36000L |
| Hydr Basin #: | UPPER SANTA ANA VALL |
| Beneficial: | Not reported |
| Priority: | Not reported |
| Cleanup Fund Id: | Not reported |
| Work Suspended: | Not reported |

Summary: Not reported

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**A7** **UPLAND HILLS COUNTRY CLUB** **LUST** **U001570727**
**North** **1231 E 16TH ST** **HIST UST** **N/A**
**1/8-1/4** **UPLAND, CA 95047** **San Bern. Co. Permit**
**0.186 mi.**
**984 ft.** **Site 3 of 4 in cluster A**

**Relative:**
**Higher**

**Actual:**
**1472 ft.**

LUST:

| | |
|---|---|
| Lead Agency: | SAN BERNARDINO COUNTY |
| Case Type: | LUST Cleanup Site |
| Geo Track: | http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0607100394 |
| Global Id: | T0607100394 |
| Latitude: | 34.12182 |
| Longitude: | -117.625107 |
| Status: | Completed - Case Closed |
| Status Date: | 10/23/1998 |
| Case Worker: | Not reported |
| RB Case Number: | 083602731T |
| Local Agency: | Not reported |
| File Location: | Local Agency |
| Local Case Number: | 95047 |
| Potential Media Affect: | Soil |
| Potential Contaminants of Concern: | Diesel |
| Site History: | Not reported |

LUST:

| | |
|---|---|
| Global Id: | T0607100394 |
| Contact Type: | Regional Board Caseworker |
| Contact Name: | CARL BERNHARDT |
| Organization Name: | SANTA ANA RWQCB (REGION 8) |
| Address: | 3737 MAIN STREET, SUITE 500 |
| City: | RIVERSIDE |
| Email: | cbernhardt@waterboards.ca.gov |
| Phone Number: | 9517824495 |

LUST:

| | |
|---|---|
| Global Id: | T0607100394 |
| Action Type: | Other |

**UPLAND HILLS COUNTRY CLUB (Continued)** **U001570727**

Date: 09/15/1995
Action: Leak Discovery

Global Id: T0607100394
Action Type: Other
Date: 10/06/1995
Action: Leak Stopped

Global Id: T0607100394
Action Type: ENFORCEMENT
Date: 10/23/1998
Action: Closure/No Further Action Letter

Global Id: T0607100394
Action Type: Other
Date: 09/25/1995
Action: Leak Reported

LUST:
Global Id: T0607100394
Status: Open - Case Begin Date
Status Date: 09/15/1995

Global Id: T0607100394
Status: Completed - Case Closed
Status Date: 10/23/1998

HIST UST:
File Number: 0002A96D
URL: http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0002A96D.pdf
Region: STATE
Facility ID: 00000057116
Facility Type: Other
Other Type: WASTEWATER TREATMENT
Contact Name: DAVE GEERY
Telephone: 4159812267
Owner Name: UPLAND HILLS COUNTRY CLUB ASSO
Owner Address: 460 N. EUCLID AVENUE
Owner City,St,Zip: UPLAND, CA 91786
Total Tanks: 0001

Tank Num: 001
Container Num: 1
Year Installed: 1982
Tank Capacity: 00002000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Container Construction Thickness: 0.25
Leak Detection: Stock Inventor

Click here for Geo Tracker PDF:

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0006955

**UPLAND HILLS COUNTRY CLUB (Continued)** **U001570727**

Owner: UPLAND DEVELOPMENT LLC
Permit Number: PT0003345
Permit Category: HAZARDOUS MATERIALS 4-10 CHEMICALS
Facility Status: ACTIVE
Expiration Date: 04/30/2018

Region: SAN BERNARDINO
Facility ID: FA0006955
Owner: UPLAND DEVELOPMENT LLC
Permit Number: PT0003346
Permit Category: APSA 1,320-10,000 GAL FAC CAPACITY
Facility Status: ACTIVE
Expiration Date: 04/30/2018

Region: SAN BERNARDINO
Facility ID: FA0006955
Owner: UPLAND DEVELOPMENT LLC
Permit Number: PT0003344
Permit Category: SMALL QUANTITY GENERATOR
Facility Status: ACTIVE
Expiration Date: 04/30/2018

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**A8** **UPLAND HILLS COUNTRY CLUB** **AST** **S105035895**
**North** **1231 E. 16TH ST** **N/A**
**1/8-1/4** **UPLAND, CA**
**0.186 mi.**
**984 ft.** **Site 4 of 4 in cluster A**

**Relative:** **Higher**

**Actual:** **1472 ft.**

AST:

| | |
|---|---|
| Certified Unified Program Agencies: | San Bernardino |
| Owner: | UPLAND DEVELOPMENT LLC |
| Total Gallons: | 2,000 |
| CERSID: | Not reported |
| Facility ID: | Not reported |
| Business Name: | Not reported |
| Phone: | Not reported |
| Fax: | Not reported |
| Mailing Address: | Not reported |
| Mailing Address City: | Not reported |
| Mailing Address State: | Not reported |
| Mailing Address Zip Code: | Not reported |
| Operator Name: | Not reported |
| Operator Phone: | Not reported |
| Owner Phone: | Not reported |
| Owner Mail Address: | Not reported |
| Owner State: | Not reported |
| Owner Zip Code: | Not reported |
| Owner Country: | Not reported |
| Property Owner Name: | Not reported |
| Property Owner Phone: | Not reported |
| Property Owner Mailing Address: | Not reported |
| Property Owner City: | Not reported |
| Property Owner Stat : | Not reported |
| Property Owner Zip Code: | Not reported |
| Property Owner Country: | Not reported |
| EPAID: | Not reported |

**9**
**West**
**1/8-1/4**
**0.208 mi.**
**1099 ft.**

**LANDFILLUPLAND-CLOSED**
**870 E 15TH ST**
**UPLAND, CA 91786**

**WMUDS/SWAT**
**WDS**

**S104384432**
**N/A**

**Relative:**
**Lower**

**Actual:**
**1424 ft.**

WMUDS/SWAT:

| | |
|---|---|
| Edit Date: | Not reported |
| Complexity: | Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities. |
| Primary Waste: | SLDWST |
| Primary Waste Type: | Nonhazardous Solid Wastes/Influent or Solid Wastes that contain nonhazardous putrescible and non putrescible solid, semisolid, and liquid wastes (E.G., garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid waste). |
| Secondary Waste: | Not reported |
| Secondary Waste Type: | Not reported |
| Base Meridian: | SB |
| NPID: | Not reported |
| Tonnage: | 0 |
| Regional Board ID: | Not reported |
| Municipal Solid Waste: | True |
| Superorder: | True |
| Open To Public: | False |
| Waste List: | False |
| Agency Type: | City |
| Agency Name: | UPLAND, CITY OF |
| Agency Department: | CITY MANAGER |
| Agency Address: | PO BOX 460 |
| Agency City,St,Zip: | UPLAND CA 917850460 |
| Agency Contact: | ROB TURNER |
| Agency Telephone: | 9099314231 |
| Land Owner Name: | CITY OF UPLAND |
| Land Owner Address: | P.O. BOX 460 |
| Land Owner City,St,Zip: | UPLAND, CA 91786 |
| Land Owner Contact: | MICHAEL MATLOCK, |
| Land Owner Phone: | 7149821352 |
| Region: | 8 |
| Facility Type: | Solid Waste Site-Class III - Landfills for non hazardous solid wastes. |
| Facility Description: | Not reported |
| Facility Telephone: | Not reported |
| SWAT Facility Name: | CITY OF UPLAND DISPOSAL SITE |
| Primary SIC: | 4953 |
| Secondary SIC: | Not reported |
| Comments: | Not reported |
| Last Facility Editors: | Not reported |
| Waste Discharge System: | True |
| Solid Waste Assessment Test Program: | True |
| Toxic Pits Cleanup Act Program: | False |
| Resource Conservation Recovery Act: | False |
| Department of Defence: | False |
| Solid Waste Assessment Test Program: | CITY OF UPLAND |
| Threat to Water Quality: | Major Threat to Water Quality. A violation could render unusable a ground water or surface water resource used as a significant drink water supply, require closure of an area used for contact recreation, |

**LANDFILLUPLAND-CLOSED (Continued)** **S104384432**

result in long-term deleterious effects on shell fish spawning or growth areas of aquatic resources, or directly expose the public to toxic substances.

Sub Chapter 15: True
Regional Board Project Officer: AES
Number of WMUDS at Facility: 1
Section Range: 01S07W05
RCRA Facility: No
Waste Discharge Requirements: A
Self-Monitoring Rept. Frequency: Quarterly Submittal
Waste Discharge System ID: 8 360338001
Solid Waste Information ID: 36-AA-0005

WDS:
Facility ID: Santa Ana River 360338001
Facility Type: Solid Waste Site-Class III - Landfills for non hazardous solid wastes.
Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number: Not reported
Subregion: 8
Facility Telephone: Not reported
Facility Contact: ROB TURNER
Agency Name: UPLAND CITY OF
Agency Address: PO BOX 460
Agency City,St,Zip: UPLAND 917850460
Agency Contact: ROB TURNER
Agency Telephone: 9099314231
Agency Type: City
SIC Code: 4953
SIC Code 2: Not reported
Primary Waste Type: Nonhazardous Solid Wastes/Influent or Solid Wastes that contain nonhazardous putrescible and non putrescible solid, semisolid, and liquid wastes (E.G., garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid waste).
Primary Waste: SLDWST
Waste Type2: Not reported
Waste2: Solid Wastes
Primary Waste Type: Nonhazardous Solid Wastes/Influent or Solid Wastes that contain nonhazardous putrescible and non putrescible solid, semisolid, and liquid wastes (E.G., garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid waste).
Secondary Waste: Not reported
Secondary Waste Type: Not reported
Design Flow: 0
Baseline Flow: 0
Reclamation: No reclamation requirements associated with this facility.
POTW: The facility is not a POTW.
Treat To Water: Major Threat to Water Quality. A violation could render unusable a ground water or surface water resource used as a significant drink water supply, require closure of an area used for contact recreation, result in long-term deleterious effects on shell fish spawning or growth areas of aquatic resources, or directly expose the public to toxic substances.
Complexity: Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface

**LANDFILLUPLAND-CLOSED (Continued)** **S104384432**

disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities.

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**10**
**WSW**
**1/4-1/2**
**0.327 mi.**
**1724 ft.**

**CITY OF UPLAND DISPOSAL SITE**
**OFF CAMPUS AVENUE BETWEEN 14TH & 15TH ST**
**UPLAND, CA**

**SWF/LF** **S102361916**
**N/A**

**Relative:**
**Lower**

**Actual:**
**1404 ft.**

SWF/LF (SWIS):

| | |
|---|---|
| Region: | STATE |
| Facility ID: | 36-AA-0005 |
| Lat/Long: | 34.11667 / -117.64 |
| Owner Name: | City Of Upland |
| Owner Telephone: | 9099314100 |
| Owner Address: | Not reported |
| Owner Address2: | P.O. Box 460 |
| Owner City,St,Zip: | Upland, CA 91786 |
| Operational Status: | Closed |
| Operator: | Not reported |
| Operator Phone: | Not reported |
| Operator Address: | Not reported |
| Operator Address2: | Not reported |
| Operator City,St,Zip: | Not reported |
| Permit Date: | Not reported |
| Permit Status: | Not reported |
| Permitted Acreage: | $0.00 |
| Activity: | Solid Waste Disposal Site |
| Regulation Status: | Unpermitted |
| Landuse Name: | Residential |
| GIS Source: | Map |
| Category: | Disposal |
| Unit Number: | 01 |
| Inspection Frequency: | Quarterly |
| Accepted Waste: | Not reported |
| Closure Date: | Not reported |
| Closure Type: | Not reported |
| Disposal Acreage: | $0.00 |
| SWIS Num: | 36-AA-0005 |
| Waste Discharge Requirement Num: | Not reported |
| Program Type: | Not reported |
| Permitted Throughput with Units: | 0 |
| Actual Throughput with Units: | Not reported |
| Permitted Capacity with Units: | 0 |
| Remaining Capacity: | 0 |
| Remaining Capacity with Units: | Not reported |
| Lat/Long: | 34.11667 / -117.64 |

Count: 7 records. ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| UPLAND | S106841865 | UPLAND CITY, POLICE DEPT | 1485 13TH ST | 91786 | EMI |
| UPLAND | 1023361555 | UPLAND LANDFILL | 15TH & CAMPUS AVENUE | 91786 | FINDS |
| UPLAND | 1007443891 | CITY OF UPLAND SANITARY LANDFILL S | BETWEEN 14TH AND 15TH STREETS | | ODI |
| UPLAND | S121687361 | UPLAND INTERCEPTOR RELIEF SEWER PH | GROVE AVE AND G ST | 91786 | CIWQS |
| UPLAND | S114726575 | CITY OF UPLAND DISPOSAL SITE | OFF CAMPUS AVENUE BETWEEN 14TH | | RGA LF |
| UPLAND | S114726574 | CITY OF UPLAND DISPOSAL SITE | OFF CAMPUS AVENUE BETWEEN 14TH | | RGA LF |
| UPLAND | 1023339800 | UPLAND LANDFILL | OFF CAMPUS AVENUE BETWEEN 14TH | 91786 | FINDS |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal NPL site list***

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal Delisted NPL site list***

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

***Federal CERCLIS list***

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/06/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 66

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Quarterly

***Federal CERCLIS NFRAP site list***

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 66

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Quarterly

***Federal RCRA CORRACTS facilities list***

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

***Federal RCRA generators list***

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

***Federal institutional controls / engineering controls registries***

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 02/16/2018
Date Data Arrived at EDR: 02/22/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 78

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

***Federal ERNS list***

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

***State- and tribal - equivalent NPL***

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/12/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 48

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

***State and tribal leaking storage tank lists***

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)
Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/12/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/24/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/14/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/06/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/16/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/12/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

***State and tribal registered storage tank lists***

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/13/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Varies

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51
Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 15
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/14/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/12/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 01/13/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 134

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/24/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 10/16/2017
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 80

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

***State and tribal voluntary cleanup sites***

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

***State and tribal Brownfields sites***

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38
Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/21/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Semi-Annually

***Local Lists of Landfill / Solid Waste Disposal Sites***

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 02/08/2018
Date Data Arrived at EDR: 02/09/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 39

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 01/30/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/04/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2017
Date Data Arrived at EDR: 08/18/2017
Date Made Active in Reports: 09/21/2017
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 04/24/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Quarterly

***Local Lists of Registered Storage Tanks***

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 02/28/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 27

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 04/19/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 10

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 04/24/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Quarterly

***Local Land Records***

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 01/28/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 46

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 94

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 02/08/2018
Date Data Arrived at EDR: 02/08/2018
Date Made Active in Reports: 02/08/2018
Number of Days to Update: 0

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

***Records of Emergency Release Reports***

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 02/15/2018
Date Data Arrived at EDR: 02/20/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/24/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)
Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)
Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Other Ascertainable Records***

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/13/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/11/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/15/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 01/11/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/08/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/23/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/09/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 94

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/20/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/13/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 04/09/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/27/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 01/04/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 99
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 79

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/06/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/11/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 01/25/2018
Date Data Arrived at EDR: 02/28/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 72

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 87

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 06/01/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 02/25/2018
Date Data Arrived at EDR: 03/17/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 04/13/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 30

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

CUPA SAN FRANCISCO CO: CUPA SAN FRANCISCO CO

Cupa facilities

Date of Government Version: 04/20/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 10

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

CUPA LIVERMORE-PLEASANTON: CUPA LIVERMORE-PLEASANTON

list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 02/28/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 64

Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

DRYCLEAN AVAQMD: DRYCLEAN AVAQMD

A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 52

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner’s agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 03/27/2018
Date Data Arrived at EDR: 03/29/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 36

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Annually

DRYCLEAN SOUTH COAST: DRYCLEAN SOUTH COAST

A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 03/16/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 08/15/2017
Number of Days to Update: 147

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/23/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 54

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 55

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/14/2018
Date Data Arrived at EDR: 02/16/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 46

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/12/2017
Date Made Active in Reports: 10/17/2017
Number of Days to Update: 97

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/12/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 41

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 41

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/08/2018
Date Data Arrived at EDR: 01/09/2018
Date Made Active in Reports: 02/06/2018
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/11/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 02/27/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 42

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 03/14/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 04/19/2018
Number of Days to Update: 45

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 03/23/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region’s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 04/13/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Varies

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 04/24/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

SAMPLING POINT: SAMPLING POINT (GEOTRACKER)

Sampling point - public sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)

Military privatized sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

WELL STIM PROJ: WELL SAMP PROJ (GEOTRACKER)

Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

UIC GEO: UIC GEO (GEOTRACKER)
Underground control injection sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

OTHER OIL GAS: OTHER OIL & GAS (GEOTRACKER)
Other Oil & Gas Projects sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

CIWQS: The California Integrated Water Quality System
The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 60

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

PROD WATER PONDS: PROD WATER PONDS (GEOTRACKER)
Produced water ponds sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

NON-CASE INFO: NON-CASE INFO (GEOTRACKER)
Non-Case Information sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

PROJECT: PROJECT (GEOTRACKER)
Projects sites

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

## EDR HIGH RISK HISTORICAL RECORDS

### *EDR Exclusive Records*

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

## EDR RECOVERED GOVERNMENT ARCHIVES

### *Exclusive Recovered Govt. Archives*

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**COUNTY RECORDS**

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 01/11/2018
Date Made Active in Reports: 02/22/2018
Number of Days to Update: 42

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 10

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 01/25/2018
Date Data Arrived at EDR: 01/26/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 47

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/26/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 02/26/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 14

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 48

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 04/30/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/05/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 40

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 04/25/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/08/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 39

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 04/30/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 9

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/08/2018
Date Made Active in Reports: 04/30/2018
Number of Days to Update: 53

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/26/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 47

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/08/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 08/04/2017
Number of Days to Update: 56

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 02/02/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 54

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 11/14/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 28

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 02/06/2018
Date Data Arrived at EDR: 02/09/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/16/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206
Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 56
Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 01/16/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 29
Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/17/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2018
Date Data Arrived at EDR: 05/01/2018
Date Made Active in Reports: 05/14/2018
Number of Days to Update: 13
Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/11/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/01/2018
Date Data Arrived at EDR: 01/17/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 28
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/17/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/11/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/10/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 54
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/05/2018
Date Made Active in Reports: 01/18/2018
Number of Days to Update: 13

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/22/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 40

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 03/30/2018
Date Data Arrived at EDR: 04/06/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 28

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 01/11/2018
Date Data Arrived at EDR: 01/12/2018
Date Made Active in Reports: 02/08/2018
Number of Days to Update: 27

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 15

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

MONTEREY COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/27/2018
Date Data Arrived at EDR: 03/29/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 18

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 30

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 01/31/2018
Date Data Arrived at EDR: 02/01/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 41

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 04/25/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/05/2018
Date Data Arrived at EDR: 02/13/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 49

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/05/2018
Date Data Arrived at EDR: 02/13/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 35

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 02/07/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 49

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/15/2018
Date Data Arrived at EDR: 03/19/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 46

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 50

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/19/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/19/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 01/03/2018
Date Made Active in Reports: 02/05/2018
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 01/03/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 42

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 11/01/2017
Date Data Arrived at EDR: 11/03/2017
Date Made Active in Reports: 11/17/2017
Number of Days to Update: 14

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/01/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 46

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 04/06/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/07/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 40

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

Local Oversight Program Listing
A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/23/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 11
Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/07/2017
Date Made Active in Reports: 12/19/2017
Number of Days to Update: 42
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/20/2018
Date Data Arrived at EDR: 03/22/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 43
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/16/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/18/2017
Number of Days to Update: 31

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 03/14/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/15/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/20/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 27

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 02/04/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 42
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90
Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51
Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 52
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 16
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 20

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/22/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/06/2018
Date Made Active in Reports: 05/09/2018
Number of Days to Update: 33

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/22/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 02/06/2018
Date Data Arrived at EDR: 02/07/2018
Date Made Active in Reports: 03/16/2018
Number of Days to Update: 37

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 04/16/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 01/08/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/30/2018
Number of Days to Update: 29

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List
Cupa facilities

Date of Government Version: 01/26/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 47

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/22/2018
Date Made Active in Reports: 04/17/2018
Number of Days to Update: 26

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/16/2018
Number of Days to Update: 50

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/18/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 12/26/2017
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 48

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/23/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 12/26/2017
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 54

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/23/2018
Next Scheduled EDR Contact: 08/06/2018
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/28/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/30/2018
Number of Days to Update: 16

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 03/27/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 31

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List

CUPA facility listing for Yuba County.

Date of Government Version: 02/01/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 47

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 04/25/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

**OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/22/2018
Number of Days to Update: 36

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 07/27/2017
Number of Days to Update: 107

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/23/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/03/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 35

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/12/2018
Next Scheduled EDR Contact: 07/30/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 07/14/2017
Number of Days to Update: 92

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

**STREET AND ADDRESS INFORMATION**

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# GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

**TARGET PROPERTY ADDRESS**

UPLAND SITE
EAST 15TH STREET/NORTH 13TH AVENUE
UPLAND, CA 91786

**TARGET PROPERTY COORDINATES**

| | |
|---|---|
| Latitude (North): | 34.118806 - 34° 7' 7.70'' |
| Longitude (West): | 117.632694 - 117° 37' 57.70'' |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 441651.8 |
| UTM Y (Meters): | 3775315.0 |
| Elevation: | 1430 ft. above sea level |

**USGS TOPOGRAPHIC MAP**

| | |
|---|---|
| Target Property Map: | 5619074 ONTARIO, CA |
| Version Date: | 2012 |
| Northeast Map: | 5630609 CUCAMONGA PEAK, CA |
| Version Date: | 2012 |
| Southeast Map: | 5620426 GUASTI, CA |
| Version Date: | 2012 |
| Northwest Map: | 5630625 MOUNT BALDY, CA |
| Version Date: | 2012 |

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

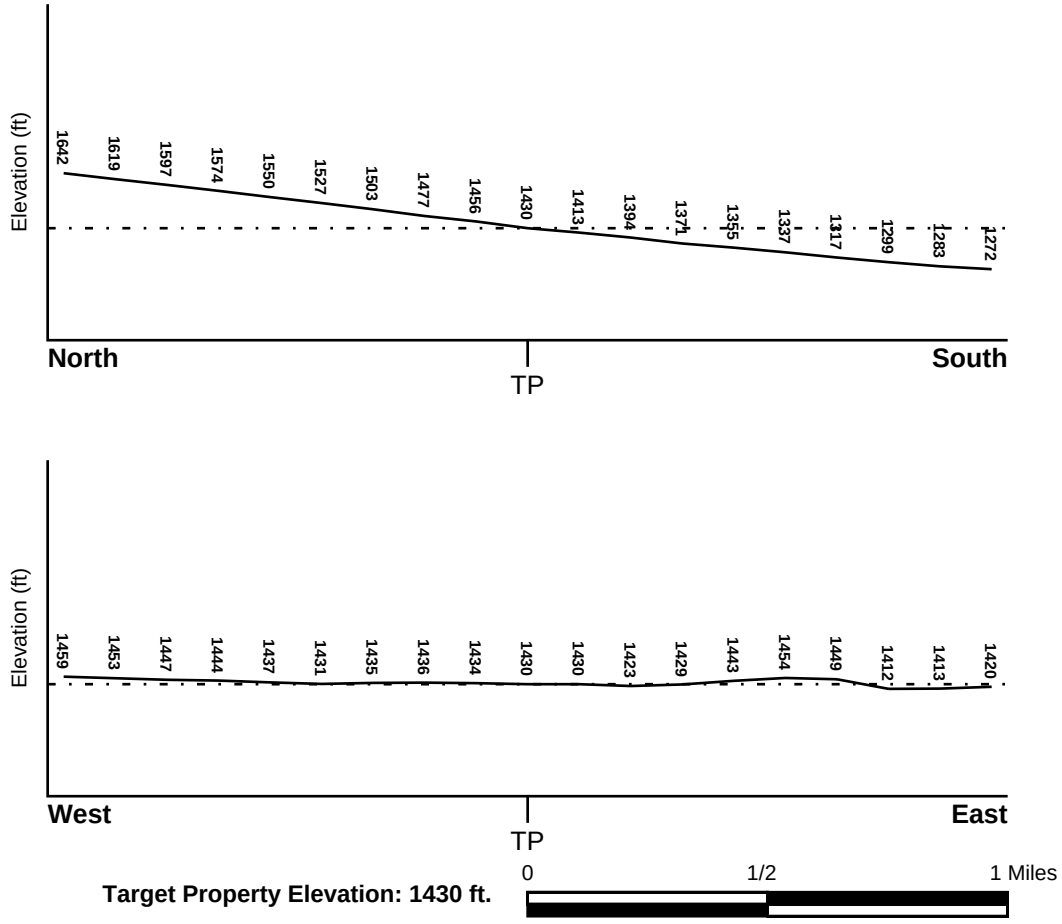
**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

General Topographic Gradient: General South

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**




Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**HYDROLOGIC INFORMATION**

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

**FEMA FLOOD ZONE**

| Flood Plain Panel at Target Property | FEMA Source Type |
|---|---|
| 06037C1750F | FEMA FIRM Flood data |

| Additional Panels in search area: | FEMA Source Type |
|---|---|
| 06037C1475F | FEMA FIRM Flood data |
| 06071C7870H | FEMA FIRM Flood data |
| 06071C7890H | FEMA FIRM Flood data |
| 06071C8607H | FEMA FIRM Flood data |
| 06071C8630J | FEMA FIRM Flood data |

**NATIONAL WETLAND INVENTORY**

| NWI Quad at Target Property | NWI Electronic Data Coverage |
|---|---|
| ONTARIO | YES - refer to the Overview Map and Detail Map |

**HYDROGEOLOGIC INFORMATION**

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

***Site-Specific Hydrogeological Data*:***

| | |
|---|---|
| Search Radius: | 1.25 miles |
| Status: | Not found |

**AQUIFLOW®**

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

| MAP ID | LOCATION FROM TP | GENERAL DIRECTION GROUNDWATER FLOW |
|---|---|---|
| 6 | 1/2 - 1 Mile ENE | SSE |
| 1G | 1/2 - 1 Mile ENE | SSE |

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW VELOCITY INFORMATION**

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

**GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

**ROCK STRATIGRAPHIC UNIT**

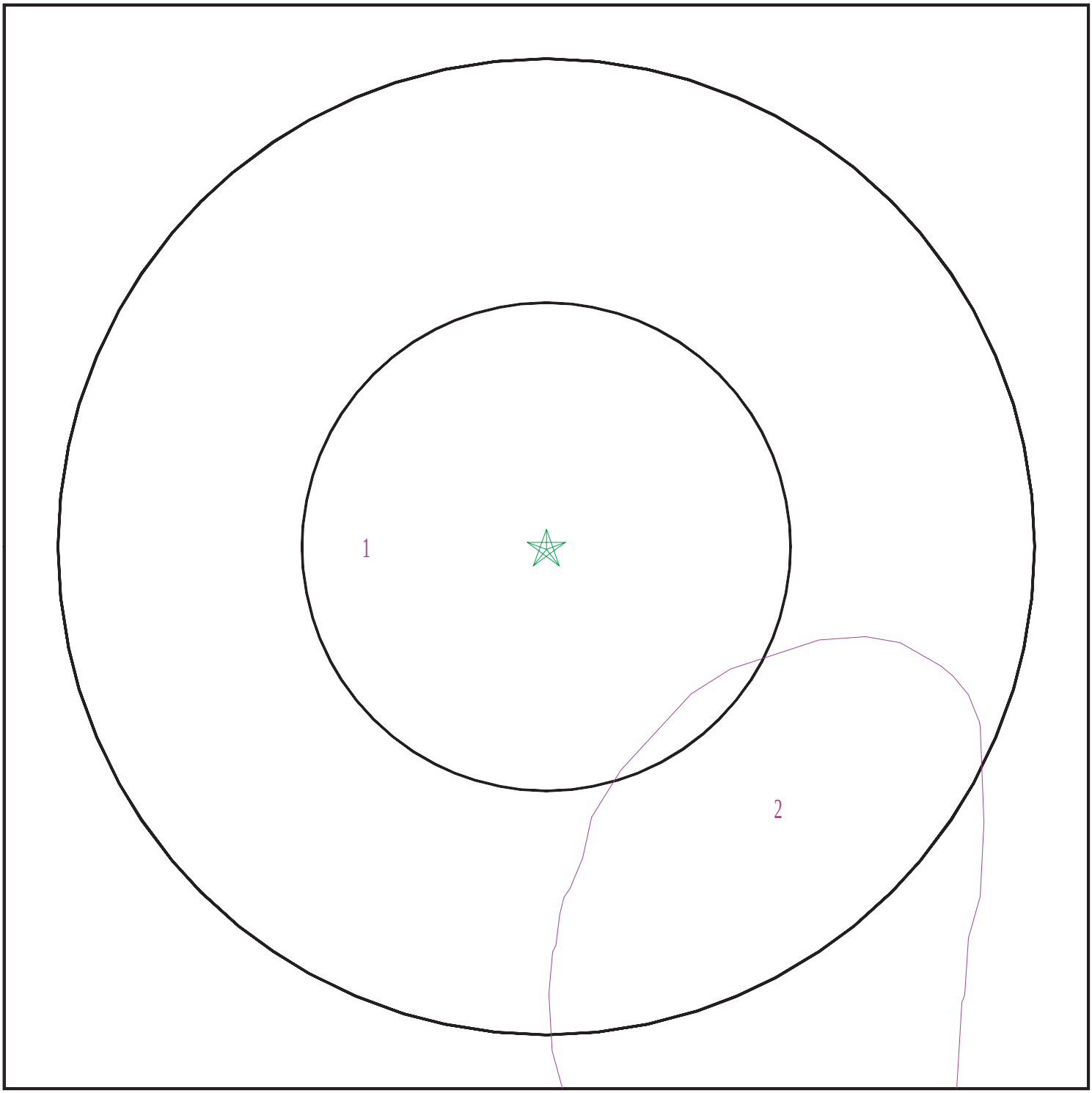
| | |
|---|---|
| Era: | Cenozoic |
| System: | Quaternary |
| Series: | Quaternary |
| Code: | Q *(decoded above as Era, System & Series)* |

**GEOLOGIC AGE IDENTIFICATION**

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

# SSURGO SOIL MAP - 5331724.2s




| | | | |
|---|---|---|---|
| SITE NAME: | Upland Site | CLIENT: | Geotek |
| ADDRESS: | East 15th Street/North 13th Avenue<br>Upland CA 91786 | CONTACT: | Anna M. Scott |
| LAT/LONG: | 34.118806 / 117.632694 | INQUIRY #: | 5331724.2s |
| | | DATE: | June 14, 2018 12:54 pm |

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# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

---

**Soil Map ID: 1**

Soil Component Name: Soboba

Soil Surface Texture: very stony loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

| Soil Layer Information | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boundary | | | Classification | | Saturated hydraulic conductivity micro m/sec | Soil Reaction (pH) |
| Layer | Upper | Lower | Soil Texture Class | AASHTO Group | Unified Soil | | |
| 1 | 0 inches | 9 inches | very stony loamy sand | Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand. | COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand. | Max: 141 Min: 42 | Max: 6.1 Min: 5.6 |
| 2 | 9 inches | 59 inches | very stony sand | Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand. | COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. | Max: 141 Min: 141 | Max: 7.8 Min: 6.6 |

**Soil Map ID: 2**

Soil Component Name: SOBOBA

Soil Surface Texture: gravelly loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

**Soil Layer Information**

| | Boundary | | | Classification | | Saturated hydraulic conductivity micro m/sec | Soil Reaction (pH) |
|---|---|---|---|---|---|---|---|
| Layer | Upper | Lower | Soil Texture Class | AASHTO Group | Unified Soil | | |
| 1 | 0 inches | 11 inches | gravelly loamy sand | Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand. | COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand. | Max: 141<br>Min: 42 | Max: 6.5<br>Min: 6.1 |
| 2 | 11 inches | 35 inches | very gravelly loamy sand | Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand. | COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel. | Max: 141<br>Min: 42 | Max: 6.5<br>Min: 6.1 |
| 3 | 35 inches | 59 inches | very stony sand | Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand. | COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. | Max: 141<br>Min: 141 | Max: 7.3<br>Min: 6.6 |

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

## LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

## WELL SEARCH DISTANCE INFORMATION

| DATABASE | SEARCH DISTANCE (miles) |
|---|---|
| Federal USGS | 1.000 |
| Federal FRDS PWS | Nearest PWS within 0.001 miles |
| State Database | 1.000 |

## FEDERAL USGS WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| B7 | USGS40000141447 | 1/2 - 1 Mile East |
| 10 | USGS40000141446 | 1/2 - 1 Mile ENE |

## FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| No PWS System Found | | |

Note: PWS System location is not always the same as well location.

## STATE DATABASE WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| A1 | 317 | 1/8 - 1/4 Mile SSW |
| A2 | 318 | 1/8 - 1/4 Mile SSW |
| 3 | CADW60000003880 | 1/4 - 1/2 Mile ESE |
| 4 | 316 | 1/4 - 1/2 Mile NW |
| 5 | 329 | 1/2 - 1 Mile ENE |
| 8 | 322 | 1/2 - 1 Mile NE |
| 9 | 323 | 1/2 - 1 Mile NE |
| B11 | CADW60000003399 | 1/2 - 1 Mile East |
| C12 | 18752 | 1/2 - 1 Mile NE |
| C13 | CADW60000003881 | 1/2 - 1 Mile NE |
| D14 | 1064 | 1/2 - 1 Mile East |
| D15 | 1063 | 1/2 - 1 Mile East |
| D16 | 1062 | 1/2 - 1 Mile East |
| D17 | 1066 | 1/2 - 1 Mile East |
| D18 | 326 | 1/2 - 1 Mile East |
| D19 | 325 | 1/2 - 1 Mile East |
| D20 | 324 | 1/2 - 1 Mile East |

# PHYSICAL SETTING SOURCE MAP - 5331724.2s




- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

| | |
|---|---|
| SITE NAME: Upland Site | CLIENT: Geotek |
| ADDRESS: East 15th Street/North 13th Avenue<br>Upland CA 91786 | CONTACT: Anna M. Scott<br>INQUIRY #: 5331724.2s |
| LAT/LONG: 34.118806 / 117.632694 | DATE: June 14, 2018 12:54 pm |

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# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

**A1**
**SSW**
**1/8 - 1/4 Mile**
**Lower**

**CA WELLS** **317**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-32R01 S | User ID: | TAN |
| FRDS Number: | 3610085003 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173800.0 | Precision: | Undefined |
| Source Name: | SAN ANTONIO WELL 02 | | |
| System Number: | 3610085 | | |
| System Name: | SAN ANTONIO WATER COMPANY | | |
| Organization That Operates System: | | | |
| | 139 N EUCLID AVE | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 2927 | Connections: | 1108 |
| Area Served: | SAN ANTONIO HEIGHTS | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 0.99 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 17-JAN-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 17-JAN-12 | Findings: | 5.7 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-FEB-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 07-FEB-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-FEB-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-MAR-12 | Findings: | 7.2 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-MAR-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-12 | Findings: | 0.93 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 23-APR-12 | Findings: | 0.8 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 01-MAY-12 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 01-MAY-12 | Findings: | 5.7 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-MAY-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 15-MAY-12 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 12-JUN-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 12-JUN-12 | Findings: | 9.5 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-JUN-12 | Findings: | 7.3 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 26-JUN-12 | Findings: | 9.8 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 360. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 180. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 170. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 53. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 9.4 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 12. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.6 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 6.7 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 23. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.51 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 4.3 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 10-JUL-12 | Findings: | 240. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.69 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.13 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 10-JUL-12 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.2 NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 11.89 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 2400. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.2 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 14-AUG-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 14-AUG-12 | Findings: | 9.4 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-AUG-12 | Findings: | 7.9 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 28-AUG-12 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 11-SEP-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 11-SEP-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-SEP-12 | Findings: | 7.2 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-SEP-12 | Findings: | 9.7 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-OCT-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1. PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 23-OCT-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-OCT-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-NOV-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 06-NOV-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-NOV-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 20-NOV-12 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-JAN-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 22-JAN-13 | Findings: | 9.1 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-MAR-13 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-APR-13 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-MAY-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-MAY-13 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-JUN-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 04-JUN-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-JUN-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-JUN-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-JUL-13 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 09-JUL-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-JUL-13 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-AUG-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-AUG-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-AUG-13 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 20-AUG-13 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 03-SEP-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 24-SEP-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 24-SEP-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-OCT-13 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-NOV-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 19-NOV-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-DEC-13 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 31-DEC-13 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-JAN-14 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-14 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-JAN-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-FEB-14 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-MAR-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-MAR-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-APR-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-MAY-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-MAY-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUN-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUL-14 | Findings: | 13.3 C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 08-JUL-14 | Findings: | 380. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 08-JUL-14 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 08-JUL-14 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 08-JUL-14 | Findings: | 49. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 08-JUL-14 | Findings: | 0.58 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 08-JUL-14 | Findings: | - 0.12 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 08-JUL-14 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUL-14 | Findings: | 11.78 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 05-AUG-14 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-AUG-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-SEP-14 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 30-SEP-14 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-NOV-14 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-DEC-14 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-DEC-14 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 13-JAN-15 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-FEB-15 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 10-FEB-15 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 24-FEB-15 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 24-FEB-15 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-FEB-15 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-APR-15 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-APR-15 | Findings: | 7.1 MG/L |
| Chemical: | NITRATE (AS NO3) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 28-APR-15 | Findings: | 7.3 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 02-JUN-15 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUN-15 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 390. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 7.6 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 14-JUL-15 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 14-JUL-15 | Findings: | 180. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 14-JUL-15 | Findings: | 170. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 14-JUL-15 | Findings: | 55. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 9.1 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 11. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 1.7 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 6.9 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 24. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 0.38 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 4.9 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 250. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 14-JUL-15 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 2800. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 04-AUG-15 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 04-AUG-15 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-AUG-15 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 01-SEP-15 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-SEP-15 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 16-SEP-15 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-SEP-15 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 29-SEP-15 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 27-OCT-15 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 3.3 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-APR-16 | Findings: | 3.6 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-APR-16 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-JUL-16 | Findings: | 3.2 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-JUL-16 | Findings: | 1.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-SEP-16 | Findings: | 2.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-OCT-16 | Findings: | 3. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-JAN-17 | Findings: | 3.7 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-JAN-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-APR-17 | Findings: | 3.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-APR-17 | Findings: | 4.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-JUL-17 | Findings: | 3.6 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-OCT-17 | Findings: | 3.5 MG/L |
| Chemical: | NITRATE (AS N) | | |

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**A2**
**SSW**
**1/8 - 1/4 Mile**
**Lower**

**CA WELLS** **318**

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-32R02 S | User ID: | TAN |
| FRDS Number: | 3610085004 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173800.0 | Precision: | Undefined |
| Source Name: | SAN ANTONIO WELL 03 | | |
| System Number: | 3610085 | | |
| System Name: | SAN ANTONIO WATER COMPANY | | |
| Organization That Operates System: | | | |
| | 139 N EUCLID AVE | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 2927 | Connections: | 1108 |
| Area Served: | SAN ANTONIO HEIGHTS | | |
| Sample Collected: | 11-JAN-12 | Findings: | 4.4 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.4 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 3.3 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 11-JAN-12 | Findings: | 0.97 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1. PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 11-JAN-12 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 17-JAN-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 17-JAN-12 | Findings: | 7.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 17-JAN-12 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-12 | Findings: | 3.8 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 23-APR-12 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 23-APR-12 | Findings: | 1. PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 01-MAY-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 01-MAY-12 | Findings: | 6.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-MAY-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

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|---|---|---|---|
| Sample Collected: | 12-JUN-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 12-JUN-12 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-JUN-12 | Findings: | 23. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-JUN-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 26-JUN-12 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JUN-12 | Findings: | 24. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 400. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 140. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 180. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 190. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 59. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 10. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 14. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 2. MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 9.2 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 27. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.4 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 4.4 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 4.6 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.4 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 10-JUL-12 | Findings: | 260. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.83 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.18 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 10-JUL-12 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 12.03 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 5900. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1. PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 17-JUL-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-12 | Findings: | 7.9 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 31-JUL-12 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-12 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-AUG-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 14-AUG-12 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 14-AUG-12 | Findings: | 25. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-AUG-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 28-AUG-12 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-AUG-12 | Findings: | 27. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 11-SEP-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 11-SEP-12 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-SEP-12 | Findings: | 28. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-SEP-12 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-SEP-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 25-SEP-12 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-OCT-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 09-OCT-12 | Findings: | 8.1 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 09-OCT-12 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-OCT-12 | Findings: | 27. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-OCT-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-OCT-12 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-OCT-12 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-NOV-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-NOV-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-NOV-12 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-JAN-13 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 22-JAN-13 | Findings: | 9.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-JAN-13 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-MAR-13 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-MAR-13 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-APR-13 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-APR-13 | Findings: | 27. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-13 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 23-APR-13 | Findings: | 27. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-MAY-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-MAY-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-MAY-13 | Findings: | 27. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-JUN-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 04-JUN-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-JUN-13 | Findings: | 29. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-JUN-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-JUN-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-JUN-13 | Findings: | 29. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-JUL-13 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 09-JUL-13 | Findings: | 9.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-JUL-13 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-JUL-13 | Findings: | 9.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-AUG-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-AUG-13 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-AUG-13 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-AUG-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 20-AUG-13 | Findings: | 8.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-AUG-13 | Findings: | 31. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

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|---|---|---|---|
| Sample Collected: | 03-SEP-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 03-SEP-13 | Findings: | 8.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 33. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 24-SEP-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 24-SEP-13 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-SEP-13 | Findings: | 33. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-OCT-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-OCT-13 | Findings: | 31. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-NOV-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-NOV-13 | Findings: | 32. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 19-NOV-13 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-NOV-13 | Findings: | 32. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 15-JUL-14 | Findings: | 460. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 15-JUL-14 | Findings: | 7.5 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 15-JUL-14 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 15-JUL-14 | Findings: | 65. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 15-JUL-14 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 0.71 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 15-JUL-14 | Findings: | 0.11 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 15-JUL-14 | Findings: | 38. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 11.92 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |

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|---|---|---|---|
| Sample Collected: | 05-AUG-14 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-AUG-14 | Findings: | 40. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-AUG-14 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-AUG-14 | Findings: | 39. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-SEP-14 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-SEP-14 | Findings: | 37. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 30-SEP-14 | Findings: | 1.3 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 30-SEP-14 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 30-SEP-14 | Findings: | 38. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-NOV-14 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-NOV-14 | Findings: | 37. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-APR-15 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-APR-15 | Findings: | 41. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUN-15 | Findings: | 0.21 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JUN-15 | Findings: | 42. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 450. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 14-JUL-15 | Findings: | 140. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 14-JUL-15 | Findings: | 170. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 14-JUL-15 | Findings: | 200. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 14-JUL-15 | Findings: | 63. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 9.9 MG/L |
| Chemical: | MAGNESIUM | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 14-JUL-15 | Findings: | 12. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 2. MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 8.3 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 35. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 14-JUL-15 | Findings: | 0.37 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 3.9 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 14-JUL-15 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 320. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 14-JUL-15 | Findings: | 38. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-JUL-15 | Findings: | 8600. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 04-AUG-15 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 04-AUG-15 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-AUG-15 | Findings: | 38. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-AUG-15 | Findings: | 0.18 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-AUG-15 | Findings: | 43. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 01-SEP-15 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-SEP-15 | Findings: | 43. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 44. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 9.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 26-JUL-16 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 26-JUL-16 | Findings: | 0.27 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-SEP-16 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 13-SEP-16 | Findings: | 0.25 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-OCT-16 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-OCT-16 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JAN-17 | Findings: | 0.29 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-APR-17 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-APR-17 | Findings: | 0.33 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-JUL-17 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 25-JUL-17 | Findings: | 0.21 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-OCT-17 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-OCT-17 | Findings: | 1.4 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 31-OCT-17 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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**3**
**ESE**
**1/4 - 1/2 Mile**
**Lower**

**CA WELLS** **CADW60000003880**

| | |
|---|---|
| Objectid: | 3880 |
| Latitude: | 34.116777 |
| Longitude: | -117.627152 |
| Site code: | 341168N1176272W001 |
| State well numbe: | 01S07W04D001S |
| Local well name: | 'CUCAMONGA-1002294' |
| Well use id: | 1 |
| Well use descrip: | Observation |
| County id: | 36 |
| County name: | San Bernardino |
| Basin code: | '8-2.02' |
| Basin desc: | Cucamonga |
| Dwr region id: | 80238 |
| Dwr region: | Southern Region Office |
| Site id: | CADW60000003880 |

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

**4**
**NW**
**1/4 - 1/2 Mile**
**Higher** | **CA WELLS** | **316**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-29P01 S | User ID: | TAN |
| FRDS Number: | 3610050036 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340724.0 1173809.0 | Precision: | 1,000 Feet (10 Seconds) |
| Source Name: | WELL 15 | | |
| System Number: | 3610050 | | |
| System Name: | CITY OF UPLAND | | |
| Organization That Operates System: | | | |
| | PO BOX 460 | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 66383 | Connections: | 16736 |
| Area Served: | UPLAND VIC | | |
| Sample Collected: | 29-AUG-12 | Findings: | 260. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 29-AUG-12 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-AUG-13 | Findings: | 3. PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 21-AUG-13 | Findings: | 240. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 21-AUG-13 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-AUG-13 | Findings: | 3. PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 26-AUG-14 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-SEP-14 | Findings: | 380. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 25-SEP-14 | Findings: | 7.8 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 25-SEP-14 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 25-SEP-14 | Findings: | 190. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 25-SEP-14 | Findings: | 180. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 25-SEP-14 | Findings: | 59. MG/L |
| Chemical: | CALCIUM | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 25-SEP-14 | Findings: | 8. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 25-SEP-14 | Findings: | 12. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 25-SEP-14 | Findings: | 1.6 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 25-SEP-14 | Findings: | 3. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 25-SEP-14 | Findings: | 23. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 25-SEP-14 | Findings: | 0.44 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 25-SEP-14 | Findings: | 0.82 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 25-SEP-14 | Findings: | 8.5 MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-SEP-14 | Findings: | 4900. UG/L |
| Chemical: | CARBON DIOXIDE | | |
| Sample Collected: | 25-SEP-14 | Findings: | 12. |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 25-SEP-14 | Findings: | 1900. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 13-APR-16 | Findings: | 2.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 13-APR-16 | Findings: | 250. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 17-AUG-16 | Findings: | 3. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 17-AUG-16 | Findings: | 2.7 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 17-AUG-16 | Findings: | 1.7 PCI/L |
| Chemical: | GROSS BETA COUNTING ERROR | | |
| Sample Collected: | 17-AUG-16 | Findings: | 5.4 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 17-AUG-16 | Findings: | 260. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 17-AUG-16 | Findings: | 3. PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 17-AUG-16 | Findings: | 0.4 PCI/L |
| Chemical: | RADIUM 226 MDA95 | | |
| Sample Collected: | 17-AUG-16 | Findings: | 0.82 PCI/L |
| Chemical: | RADIUM 228 MDA95 | | |
| Sample Collected: | 17-AUG-16 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS BETA MDA95 | | |

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|---|---|---|---|
| Sample Collected: | 21-AUG-17 | Findings: | 3. UNITS |
| Chemical: | COLOR | | |
| Sample Collected: | 21-AUG-17 | Findings: | 380. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 21-AUG-17 | Findings: | 8.1 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 21-AUG-17 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 21-AUG-17 | Findings: | 200. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 21-AUG-17 | Findings: | 2. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-AUG-17 | Findings: | 160. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 21-AUG-17 | Findings: | 54. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 21-AUG-17 | Findings: | 7.2 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 21-AUG-17 | Findings: | 11. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 21-AUG-17 | Findings: | 3.2 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 21-AUG-17 | Findings: | 21. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 21-AUG-17 | Findings: | 0.42 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 21-AUG-17 | Findings: | 380. UG/L |
| Chemical: | COPPER | | |
| Sample Collected: | 21-AUG-17 | Findings: | 1100. UG/L |
| Chemical: | IRON | | |
| Sample Collected: | 21-AUG-17 | Findings: | 560. UG/L |
| Chemical: | ALUMINUM | | |
| Sample Collected: | 21-AUG-17 | Findings: | 5.6 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 21-AUG-17 | Findings: | 5. NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 06-DEC-17 | Findings: | 1.8 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-DEC-17 | Findings: | 3.2 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 06-DEC-17 | Findings: | 22. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 06-DEC-17 | Findings: | 230. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 06-DEC-17 | Findings: | 1.8 MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |

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**5**
**ENE** **CA WELLS** **329**
**1/2 - 1 Mile**
**Higher**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-34A07 S | User ID: | TAN |
| FRDS Number: | 3610018033 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340720.0 1173715.0 | Precision: | 1,000 Feet (10 Seconds) |
| Source Name: | WELL 23 | | |
| System Number: | 3610018 | | |
| System Name: | CUCAMONGA CWD | | |
| Organization That Operates System: | | | |
| | P O BOX 638 | | |
| | CUCAMONGA 91730 | | |
| Pop Served: | 128000 | Connections: | 34398 |
| Area Served: | CUCAMONGA | | |
| Sample Collected: | 29-MAY-14 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 29-MAY-14 | Findings: | 580. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 29-MAY-14 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 29-MAY-14 | Findings: | 170. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 29-MAY-14 | Findings: | 210. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 29-MAY-14 | Findings: | 250. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 29-MAY-14 | Findings: | 75. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 29-MAY-14 | Findings: | 15. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 29-MAY-14 | Findings: | 20. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 29-MAY-14 | Findings: | 2.1 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 29-MAY-14 | Findings: | 17. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 29-MAY-14 | Findings: | 42. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.17 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 29-MAY-14 | Findings: | 21. UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 29-MAY-14 | Findings: | 4.1 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 29-MAY-14 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 29-MAY-14 | Findings: | 380. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.96 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.36 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 29-MAY-14 | Findings: | 74. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.8 NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 29-MAY-14 | Findings: | 12.18 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.57 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 29-MAY-14 | Findings: | 17000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 29-MAY-14 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.562 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.2 PCI/L |
| Chemical: | RADIUM 228 MDA95 | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.119 PCI/L |
| Chemical: | RA-226 OR TOTAL RA BY 903.0 C.E. | | |
| Sample Collected: | 29-MAY-14 | Findings: | 0.418 PCI/L |
| Chemical: | RADIUM, TOTAL, MDA95-NTNC ONLY, BY 903.0 | | |
| Sample Collected: | 10-JUN-14 | Findings: | 73. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-JUN-14 | Findings: | 71. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUN-14 | Findings: | 71. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 30-JUN-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUL-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 14-JUL-14 | Findings: | 70. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JUL-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-JUL-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-AUG-14 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-AUG-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 11-AUG-14 | Findings: | 1.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-AUG-14 | Findings: | 67. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-AUG-14 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 18-AUG-14 | Findings: | 530. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 18-AUG-14 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 18-AUG-14 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 18-AUG-14 | Findings: | 190. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 18-AUG-14 | Findings: | 200. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 18-AUG-14 | Findings: | 61. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 18-AUG-14 | Findings: | 11. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 18-AUG-14 | Findings: | 26. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 18-AUG-14 | Findings: | 1.9 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 18-AUG-14 | Findings: | 15. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 18-AUG-14 | Findings: | 39. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.2 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 18-AUG-14 | Findings: | 3.4 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 18-AUG-14 | Findings: | 24. UG/L |
| Chemical: | VANADIUM | | |

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|---|---|---|---|
| Sample Collected: | 18-AUG-14 | Findings: | 5.2 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 18-AUG-14 | Findings: | 2. PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 18-AUG-14 | Findings: | 380. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.83 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.23 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 18-AUG-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.2 NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 18-AUG-14 | Findings: | 12.05 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.52 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 18-AUG-14 | Findings: | 16000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 18-AUG-14 | Findings: | 1.8 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.497 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.2 PCI/L |
| Chemical: | RADIUM 228 MDA95 | | |
| Sample Collected: | 18-AUG-14 | Findings: | 9.1e-002 PCI/L |
| Chemical: | RA-226 OR TOTAL RA BY 903.0 C.E. | | |
| Sample Collected: | 18-AUG-14 | Findings: | 0.363 PCI/L |
| Chemical: | RADIUM, TOTAL, MDA95-NTNC ONLY, BY 903.0 | | |
| Sample Collected: | 25-AUG-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 02-SEP-14 | Findings: | 71. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-SEP-14 | Findings: | 3.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 08-SEP-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-SEP-14 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 16-SEP-14 | Findings: | 67. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

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|---|---|---|---|
| Sample Collected: | 22-SEP-14 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-SEP-14 | Findings: | 71. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-SEP-14 | Findings: | 70. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-OCT-14 | Findings: | 2.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 07-OCT-14 | Findings: | 72. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 13-OCT-14 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-OCT-14 | Findings: | 70. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-OCT-14 | Findings: | 3.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-OCT-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 27-OCT-14 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 27-OCT-14 | Findings: | 67. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 20-NOV-14 | Findings: | 540. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 20-NOV-14 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 20-NOV-14 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 20-NOV-14 | Findings: | 190. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 20-NOV-14 | Findings: | 200. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 20-NOV-14 | Findings: | 62. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 20-NOV-14 | Findings: | 12. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 20-NOV-14 | Findings: | 31. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 20-NOV-14 | Findings: | 1.7 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 20-NOV-14 | Findings: | 15. MG/L |
| Chemical: | CHLORIDE | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 20-NOV-14 | Findings: | 41. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.13 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 3.7 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 20-NOV-14 | Findings: | 23. UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 20-NOV-14 | Findings: | 5.9 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 20-NOV-14 | Findings: | 1.8 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 20-NOV-14 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 330. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.84 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.23 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 20-NOV-14 | Findings: | 72. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 12.05 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.5 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 20-NOV-14 | Findings: | 16000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 20-NOV-14 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.612 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.2 PCI/L |
| Chemical: | RADIUM 228 MDA95 | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.166 PCI/L |
| Chemical: | RA-226 OR TOTAL RA BY 903.0 C.E. | | |
| Sample Collected: | 20-NOV-14 | Findings: | 0.363 PCI/L |
| Chemical: | RADIUM, TOTAL, MDA95-NTNC ONLY, BY 903.0 | | |
| Sample Collected: | 01-DEC-14 | Findings: | 70. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 01-DEC-14 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 09-DEC-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-DEC-14 | Findings: | 1.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-DEC-14 | Findings: | 2.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-DEC-14 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-DEC-14 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-DEC-14 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 29-DEC-14 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 29-DEC-14 | Findings: | 67. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-JAN-15 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-JAN-15 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-JAN-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 19-JAN-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-JAN-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-FEB-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-MAR-15 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-MAR-15 | Findings: | 74. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-MAR-15 | Findings: | 0.57 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 05-MAR-15 | Findings: | 0.89 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 05-MAR-15 | Findings: | 0.646 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 05-MAR-15 | Findings: | 0.253 PCI/L |
| Chemical: | RADIUM 228 MDA95 | | |
| Sample Collected: | 05-MAR-15 | Findings: | 7.e-002 PCI/L |
| Chemical: | RA-226 FOR CWS OR TOTAL RA FOR NTNC BY 903.0 | | |
| Sample Collected: | 05-MAR-15 | Findings: | 0.138 PCI/L |
| Chemical: | RA-226 OR TOTAL RA BY 903.0 C.E. | | |

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| Sample Collected: | 05-MAR-15 | Findings: | 0.363 PCI/L |
| Chemical: | RADIUM, TOTAL, MDA95-NTNC ONLY, BY 903.0 | | |
| Sample Collected: | 06-APR-15 | Findings: | 74. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-MAY-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-MAY-15 | Findings: | 72. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 01-JUN-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUN-15 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUN-15 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-JUN-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-JUN-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-JUN-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-JUN-15 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-JUL-15 | Findings: | 70. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-JUL-15 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-JUL-15 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-JUL-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-JUL-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-JUL-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 27-JUL-15 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 27-JUL-15 | Findings: | 71. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-AUG-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-AUG-15 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-AUG-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 11-AUG-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 17-AUG-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 17-AUG-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-AUG-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 24-AUG-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-AUG-15 | Findings: | 68. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 31-AUG-15 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 08-SEP-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-SEP-15 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 14-SEP-15 | Findings: | 69. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-SEP-15 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-SEP-15 | Findings: | 2.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-SEP-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-SEP-15 | Findings: | 2.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-SEP-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-OCT-15 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-OCT-15 | Findings: | 76. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 19-OCT-15 | Findings: | 1.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-OCT-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-OCT-15 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-NOV-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-DEC-15 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |

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|---|---|---|---|
| Sample Collected: | 07-DEC-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 12-JAN-16 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 01-FEB-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 16-FEB-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 22-FEB-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 29-FEB-16 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 29-FEB-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 07-MAR-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 14-MAR-16 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 14-MAR-16 | Findings: | 1.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-MAR-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-MAR-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-MAR-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-APR-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-APR-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-APR-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 18-APR-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 18-APR-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-APR-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-APR-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 02-MAY-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 09-MAY-16 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 09-MAY-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 16-MAY-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 16-MAY-16 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 23-MAY-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-MAY-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-MAY-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-JUN-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 15-JUN-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 20-JUN-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-JUN-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 05-JUL-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-JUL-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 18-JUL-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 26-JUL-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 02-AUG-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 08-AUG-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 15-AUG-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 22-AUG-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 29-AUG-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-SEP-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 12-SEP-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-SEP-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |

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| Sample Collected: | 04-OCT-16 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-OCT-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-OCT-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 17-OCT-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 25-OCT-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 25-OCT-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-NOV-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 01-NOV-16 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 08-NOV-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 08-NOV-16 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-NOV-16 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-NOV-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 22-NOV-16 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-NOV-16 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-NOV-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-NOV-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-DEC-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-DEC-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 12-DEC-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-DEC-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-DEC-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-DEC-16 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 27-DEC-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 04-JAN-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 10-JAN-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 16-JAN-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 16-JAN-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JAN-17 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JAN-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 30-JAN-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-FEB-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-FEB-17 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-FEB-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-FEB-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-FEB-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-FEB-17 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-MAR-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 20-MAR-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-MAR-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-MAR-17 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 27-MAR-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 03-APR-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 03-APR-17 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 10-APR-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |

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| Sample Collected: | 10-APR-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 17-APR-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 17-APR-17 | Findings: | 1.2e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-APR-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 24-APR-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-MAY-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 01-MAY-17 | Findings: | 2.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 08-MAY-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 08-MAY-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-MAY-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 15-MAY-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-MAY-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 22-MAY-17 | Findings: | 1.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 30-MAY-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 30-MAY-17 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-JUN-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 05-JUN-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-JUN-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 12-JUN-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUN-17 | Findings: | 510. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 15-JUN-17 | Findings: | 7.4 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 15-JUN-17 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 15-JUN-17 | Findings: | 180. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 15-JUN-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 15-JUN-17 | Findings: | 170. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 15-JUN-17 | Findings: | 54. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 15-JUN-17 | Findings: | 9.1 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 15-JUN-17 | Findings: | 28. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 15-JUN-17 | Findings: | 1.7 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 15-JUN-17 | Findings: | 14. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 15-JUN-17 | Findings: | 41. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 15-JUN-17 | Findings: | 4. UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 15-JUN-17 | Findings: | 33. UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 15-JUN-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUN-17 | Findings: | 350. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 15-JUN-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 19-JUN-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-JUN-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JUN-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 26-JUN-17 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-JUL-17 | Findings: | 2.7 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 03-JUL-17 | Findings: | 2.7 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 03-JUL-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 10-JUL-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 10-JUL-17 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 17-JUL-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 17-JUL-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-JUL-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 24-JUL-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-JUL-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 02-AUG-17 | Findings: | 290. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 07-AUG-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 07-AUG-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 14-AUG-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-AUG-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-AUG-17 | Findings: | 1.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-AUG-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 28-AUG-17 | Findings: | 1.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-SEP-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 05-SEP-17 | Findings: | 1.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-SEP-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-SEP-17 | Findings: | 1.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-SEP-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 18-SEP-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-SEP-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 25-SEP-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 02-OCT-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 02-OCT-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-OCT-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 09-OCT-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 16-OCT-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 23-OCT-17 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 30-OCT-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 30-OCT-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-NOV-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 06-NOV-17 | Findings: | 1.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-NOV-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 20-NOV-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 20-NOV-17 | Findings: | 2.e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 27-NOV-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-NOV-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-DEC-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 04-DEC-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-DEC-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 11-DEC-17 | Findings: | 1.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-DEC-17 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 18-DEC-17 | Findings: | 1.6e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 26-DEC-17 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 26-DEC-17 | Findings: | 1.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 02-JAN-18 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 02-JAN-18 | Findings: | 1.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 08-JAN-18 | Findings: | 15. MG/L |
| Chemical: | NITRATE (AS N) | | |

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**6**
**ENE**
**1/2 - 1 Mile**
**Higher**

| | |
|---|---|
| Site ID: | 083601603T |
| Groundwater Flow: | SSE |
| Shallow Water Depth: | 355 |
| Deep Water Depth: | 376 |
| Average Water Depth: | Not Reported |
| Date: | 10/1990 |

**AQUIFLOW** **37841**

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**B7**
**East**
**1/2 - 1 Mile**
**Lower**

**FED USGS** **USGS40000141447**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-340710117370701 | | |
| Monloc name: | 001S007W04B001S | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18070203 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 34.1194539 |
| Longitude: | -117.619498 | Sourcemap scale: | 24000 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | Not Reported |
| Vert measure units: | Not Reported | Vertacc measure val: | Not Reported |
| Vert accmeasure units: | Not Reported | | |
| Vertcollection method: | Not Reported | | |
| Vert coord refsys: | Not Reported | Countrycode: | US |
| Aquifername: | California Coastal Basin aquifers | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**8**
**NE**
**1/2 - 1 Mile**
**Higher**

**CA WELLS** **322**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-33E01 S | User ID: | TAN |
| FRDS Number: | 3610018031 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340735.0 1173720.0 | Precision: | 1,000 Feet (10 Seconds) |
| Source Name: | WELL 21 | | |
| System Number: | 3610018 | | |
| System Name: | CUCAMONGA CWD | | |
| Organization That Operates System: | | | |
| | P O BOX 638 | | |
| | CUCAMONGA 91730 | | |
| Pop Served: | 128000 | Connections: | 34398 |
| Area Served: | CUCAMONGA | | |

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**9**
**NE** **CA WELLS** **323**
**1/2 - 1 Mile**
**Lower**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-33L01 S | User ID: | TAN |
| FRDS Number: | 3610018030 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340730.0 1173715.0 | Precision: | 100 Feet (one Second) |
| Source Name: | WELL 20 | | |
| System Number: | 3610018 | | |
| System Name: | CUCAMONGA CWD | | |
| Organization That Operates System: | | | |
| | P O BOX 638 | | |
| | CUCAMONGA 91730 | | |
| Pop Served: | 128000 | Connections: | 34398 |
| Area Served: | CUCAMONGA | | |

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**10**
**ENE** **FED USGS** **USGS40000141446**
**1/2 - 1 Mile**
**Higher**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-340710117370401 | | |
| Monloc name: | 001S007W04B003S | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18070203 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 34.1212778 |
| Longitude: | -117.619111 | Sourcemap scale: | 24000 |
| Horiz Acc measure: | .5 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Global positioning system (GPS), uncorrected | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 1450 |
| Vert measure units: | feet | Vertacc measure val: | 5 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | California Coastal Basin aquifers | | |
| Formation type: | Not Reported | | |

| | | | |
|---|---|---|---|
| Aquifer type: | Not Reported | | |
| Construction date: | 1930 | Welldepth: | 764 |
| Welldepth units: | ft | Wellholedepth: | 818 |
| Wellholedepth units: | ft | | |

Ground-water levels, Number of Measurements: 0

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**B11**
**East**
**1/2 - 1 Mile**
**Higher**

**CA WELLS** **CADW60000003399**

| | |
|---|---|
| Objectid: | 3399 |
| Latitude: | 34.119684 |
| Longitude: | -117.6184 |
| Site code: | 341197N1176184W001 |
| State well numbe: | 01S07W04B002S |
| Local well name: | 'CUCAMONGA-1002288' |
| Well use id: | 6 |
| Well use descrip: | Unknown |
| County id: | 36 |
| County name: | San Bernardino |
| Basin code: | '8-2.02' |
| Basin desc: | Cucamonga |
| Dwr region id: | 80238 |
| Dwr region: | Southern Region Office |
| Site id: | CADW60000003399 |

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**C12**
**NE**
**1/2 - 1 Mile**
**Higher**

**CA WELLS** **18752**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 3610018-041 | User ID: | TAN |
| FRDS Number: | 3610018041 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340742.0 1173723.1 | Precision: | 1,000 Feet (10 Seconds) |
| Source Name: | WELL 34 | | |
| System Number: | 3610018 | | |
| System Name: | CUCAMONGA CWD | | |
| Organization That Operates System: | | | |
| | P O BOX 638 | | |
| | CUCAMONGA 91730 | | |
| Pop Served: | 128000 | Connections: | 34398 |
| Area Served: | CUCAMONGA | | |

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**C13**
**NE**
**1/2 - 1 Mile**
**Higher**

**CA WELLS** **CADW60000003881**

| | |
|---|---|
| Objectid: | 3881 |
| Latitude: | 34.128674 |
| Longitude: | -117.62383 |
| Site code: | 341287N1176238W001 |
| State well numbe: | 01N07W33M001S |
| Local well name: | 'CUCAMONGA-1203746' |
| Well use id: | 4 |
| Well use descrip: | Residential |
| County id: | 36 |
| County name: | San Bernardino |
| Basin code: | '8-2.02' |
| Basin desc: | Cucamonga |
| Dwr region id: | 80238 |
| Dwr region: | Southern Region Office |
| Site id: | CADW60000003881 |

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**D14**
**East**
**1/2 - 1 Mile**
**Lower**

**CA WELLS** **1064**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01S/07W-04B03 S | User ID: | TAN |
| FRDS Number: | 3610018007 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173700.0 | Precision: | Undefined |
| Source Name: | CUCAMONGA 12 | | |
| System Number: | 3610018 | | |
| System Name: | CUCAMONGA CWD | | |
| Organization That Operates System: | P O BOX 638<br>CUCAMONGA 91730 | | |
| Pop Served: | 128000 | Connections: | 34398 |
| Area Served: | CUCAMONGA | | |
| Sample Collected: | 03-SEP-13 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 03-SEP-13 | Findings: | 450. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 03-SEP-13 | Findings: | 7.5 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 03-SEP-13 | Findings: | 140. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 03-SEP-13 | Findings: | 170. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 03-SEP-13 | Findings: | 170. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 03-SEP-13 | Findings: | 52. MG/L |
| Chemical: | CALCIUM | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 03-SEP-13 | Findings: | 10. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 03-SEP-13 | Findings: | 20. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 03-SEP-13 | Findings: | 2.1 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 03-SEP-13 | Findings: | 11. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 03-SEP-13 | Findings: | 41. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 03-SEP-13 | Findings: | 0.42 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 2.1 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 03-SEP-13 | Findings: | 8.1 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 03-SEP-13 | Findings: | 3.6 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 03-SEP-13 | Findings: | 1.2 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 03-SEP-13 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 300. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 03-SEP-13 | Findings: | 0.55 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 03-SEP-13 | Findings: | - 6.e-002 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 03-SEP-13 | Findings: | 45. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 11.75 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 10000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 0.96 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |

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**D15**
**East**
**1/2 - 1 Mile**
**Lower**

**CA WELLS** **1063**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01S/07W-04B02 S | User ID: | TAN |
| FRDS Number: | 3610018005 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173700.0 | Precision: | Undefined |
| Source Name: | CUCAMONGA 08 | | |

System Number: 3610018
System Name: CUCAMONGA CWD
Organization That Operates System:
P O BOX 638
CUCAMONGA 91730
Pop Served: 128000 Connections: 34398
Area Served: CUCAMONGA
Sample Collected: 19-JUN-13 Findings: 0.15 UG/L
Chemical: DIBROMOCHLOROPROPANE (DBCP)

Sample Collected: 19-JUN-13 Findings: 5.3 UG/L
Chemical: PERCHLORATE

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**D16**
**East** **CA WELLS** **1062**
**1/2 - 1 Mile**
**Lower**

**Water System Information:**
Prime Station Code: 01S/07W-04B01 S User ID: TAN
FRDS Number: 3610018006 County: San Beernardino
District Number: 13 Station Type: WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type: Well/Groundwater Well Status: Active Raw
Source Lat/Long: 340700.0 1173700.0 Precision: Undefined
Source Name: CUCAMONGA 10
System Number: 3610018
System Name: CUCAMONGA CWD
Organization That Operates System:
P O BOX 638
CUCAMONGA 91730
Pop Served: 128000 Connections: 34398
Area Served: CUCAMONGA
Sample Collected: 19-JUN-13 Findings: 0.12 UG/L
Chemical: DIBROMOCHLOROPROPANE (DBCP)

Sample Collected: 19-JUN-13 Findings: 4.5 UG/L
Chemical: PERCHLORATE

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**D17**
**East** **CA WELLS** **1066**
**1/2 - 1 Mile**
**Lower**

**Water System Information:**
Prime Station Code: 01S/07W-04E03 S User ID: TAN
FRDS Number: 3610085010 County: San Beernardino
District Number: 13 Station Type: WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type: Well/Groundwater Well Status: Active Raw
Source Lat/Long: 340700.0 1173700.0 Precision: Undefined
Source Name: SAN ANTONIO WELL 22
System Number: 3610085
System Name: SAN ANTONIO WATER COMPANY
Organization That Operates System:
139 N EUCLID AVE
UPLAND, CA 91786
Pop Served: 2927 Connections: 1108
Area Served: SAN ANTONIO HEIGHTS

| | | | |
|---|---|---|---|
| Sample Collected: | 26-JUL-16 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-OCT-16 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 20-OCT-16 | Findings: | 8.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 27-JAN-17 | Findings: | 9.6 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 27-JAN-17 | Findings: | 7.9e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-APR-17 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-APR-17 | Findings: | 6.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-17 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-JUL-17 | Findings: | 9.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-NOV-17 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 03-NOV-17 | Findings: | 1.3 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 03-NOV-17 | Findings: | 9.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 23-APR-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-12 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 23-APR-12 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 500. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.8 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 200. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |

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|---|---|---|---|
| Sample Collected: | 10-JUL-12 | Findings: | 230. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 70. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 13. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 18. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 2. MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 16. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 37. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.39 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 3.3 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 10-JUL-12 | Findings: | 6.8 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 3.2 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.5 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 10-JUL-12 | Findings: | 330. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.94 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.26 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 10-JUL-12 | Findings: | 42. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 12.15 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 9400. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 05-OCT-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 05-OCT-12 | Findings: | 4.4 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.8 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 05-OCT-12 | Findings: | 5.1 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 05-OCT-12 | Findings: | 0.92 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.6 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 05-OCT-12 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 01-FEB-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 01-FEB-13 | Findings: | 0.23 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-FEB-13 | Findings: | 41. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-MAY-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 03-MAY-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-MAY-13 | Findings: | 45. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-JUL-13 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 46. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 13-AUG-13 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-AUG-13 | Findings: | 47. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-NOV-13 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-NOV-13 | Findings: | 45. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 20. C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 15-JUL-14 | Findings: | 590. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 15-JUL-14 | Findings: | 7.6 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 15-JUL-14 | Findings: | 170. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 15-JUL-14 | Findings: | 82. MG/L |
| Chemical: | CALCIUM | | |

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|---|---|---|---|
| Sample Collected: | 15-JUL-14 | Findings: | 6.9e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 0.87 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 15-JUL-14 | Findings: | 0.27 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 15-JUL-14 | Findings: | 54. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-JUL-14 | Findings: | 12.09 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 14-OCT-14 | Findings: | 1.2 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 21-APR-15 | Findings: | 7.2 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-APR-15 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-APR-15 | Findings: | 51. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JUL-15 | Findings: | 560. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 21-JUL-15 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 21-JUL-15 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 21-JUL-15 | Findings: | 190. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 21-JUL-15 | Findings: | 260. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 21-JUL-15 | Findings: | 79. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 21-JUL-15 | Findings: | 15. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 21-JUL-15 | Findings: | 18. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 21-JUL-15 | Findings: | 2.4 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 21-JUL-15 | Findings: | 21. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 21-JUL-15 | Findings: | 52. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 21-JUL-15 | Findings: | 0.3 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 21-JUL-15 | Findings: | 3.5 UG/L |
| Chemical: | ARSENIC | | |

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|---|---|---|---|
| Sample Collected: | 21-JUL-15 | Findings: | 6.8 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 21-JUL-15 | Findings: | 370. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 21-JUL-15 | Findings: | 54. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JUL-15 | Findings: | 12000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 56. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 9.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 12. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JUL-16 | Findings: | 13. MG/L |
| Chemical: | NITRATE (AS N) | | |

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**D18**
**East** **CA WELLS** **326**
**1/2 - 1 Mile**
**Lower**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-33P01 S | User ID: | TAN |
| FRDS Number: | 3610085015 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173700.0 | Precision: | Undefined |
| Source Name: | SAN ANTONIO WELL 31 | | |
| System Number: | 3610085 | | |
| System Name: | SAN ANTONIO WATER COMPANY | | |
| Organization That Operates System: | | | |
| | 139 N EUCLID AVE | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 2927 | Connections: | 1108 |
| Area Served: | SAN ANTONIO HEIGHTS | | |
| Sample Collected: | 28-JUL-15 | Findings: | 0.41 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-JUL-15 | Findings: | 75. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 12-MAY-16 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS N) | | |

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|---|---|---|---|
| Sample Collected: | 12-MAY-16 | Findings: | 0.31 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 18.89 C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 24-MAY-16 | Findings: | 580. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 24-MAY-16 | Findings: | 7.5 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 24-MAY-16 | Findings: | 160. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 24-MAY-16 | Findings: | 190. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 24-MAY-16 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 230. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 24-MAY-16 | Findings: | 76. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 24-MAY-16 | Findings: | 11. MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 24-MAY-16 | Findings: | 21. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 24-MAY-16 | Findings: | 2.3 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 24-MAY-16 | Findings: | 14. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 24-MAY-16 | Findings: | 54. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 24-MAY-16 | Findings: | 0.99 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 110. UG/L |
| Chemical: | BORON | | |
| Sample Collected: | 24-MAY-16 | Findings: | 1.5 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 24-MAY-16 | Findings: | 4. UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 24-MAY-16 | Findings: | 16. PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 24-MAY-16 | Findings: | 3.2 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 24-MAY-16 | Findings: | 0.31 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 420. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |

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|---|---|---|---|
| Sample Collected: | 24-MAY-16 | Findings: | 0.35 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 24-MAY-16 | Findings: | 11.57 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 17. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 4.4 UG/L |
| Chemical: | PERCHLORATE | | |
| Sample Collected: | 24-MAY-16 | Findings: | 2.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 03-NOV-17 | Findings: | 16. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 03-NOV-17 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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**D19**
**East** **CA WELLS** **325**
**1/2 - 1 Mile**
**Lower**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-33N03 S | User ID: | TAN |
| FRDS Number: | 3610085011 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 340700.0 1173700.0 | Precision: | Undefined |
| Source Name: | SAN ANTONIO WELL 24 | | |
| System Number: | 3610085 | | |
| System Name: | SAN ANTONIO WATER COMPANY | | |
| Organization That Operates System: | | | |
| | 139 N EUCLID AVE | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 2927 | Connections: | 1108 |
| Area Served: | SAN ANTONIO HEIGHTS | | |
| Sample Collected: | 11-JAN-12 | Findings: | 3.1 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.3 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 3.4 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 11-JAN-12 | Findings: | 0.96 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 11-JAN-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 11-JAN-12 | Findings: | 0.88 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 07-FEB-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |

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|---|---|---|---|
| Sample Collected: | 07-FEB-12 | Findings: | 9.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 07-FEB-12 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-FEB-12 | Findings: | 8.9e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-FEB-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-MAR-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-MAR-12 | Findings: | 9.5e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-MAR-12 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-APR-12 | Findings: | 8.2 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 10-APR-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 10-APR-12 | Findings: | 18. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-12 | Findings: | 1.2 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 23-APR-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |
| Sample Collected: | 15-MAY-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 15-MAY-12 | Findings: | 8.3e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-MAY-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 12-JUN-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 12-JUN-12 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-JUN-12 | Findings: | 17. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-JUN-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 26-JUN-12 | Findings: | 0.1 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JUN-12 | Findings: | 18. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 10-JUL-12 | Findings: | 370. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 10-JUL-12 | Findings: | 7.8 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 140. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 170. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 10-JUL-12 | Findings: | 170. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 10-JUL-12 | Findings: | 54. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 8.1 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 11. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.7 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 6.8 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 25. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.5 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 3.7 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.2 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 10-JUL-12 | Findings: | 250. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.88 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 10-JUL-12 | Findings: | 0.22 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 10-JUL-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 12.08 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 4400. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 10-JUL-12 | Findings: | 1.1 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |

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|---|---|---|---|
| Sample Collected: | 17-JUL-12 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-12 | Findings: | 8.1 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 31-JUL-12 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-JUL-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 14-AUG-12 | Findings: | 7.4 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 14-AUG-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 14-AUG-12 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-AUG-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 28-AUG-12 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-AUG-12 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 11-SEP-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 11-SEP-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 11-SEP-12 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-SEP-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-SEP-12 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-SEP-12 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-OCT-12 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 05-OCT-12 | Findings: | 5. PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.5 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 05-OCT-12 | Findings: | 4.4 PCI/L |
| Chemical: | URANIUM (PCI/L) | | |
| Sample Collected: | 05-OCT-12 | Findings: | 0.83 PCI/L |
| Chemical: | URANIUM COUNTING ERROR | | |
| Sample Collected: | 05-OCT-12 | Findings: | 1.2 PCI/L |
| Chemical: | GROSS ALPHA MDA95 | | |

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|---|---|---|---|
| Sample Collected: | 05-OCT-12 | Findings: | 0.87 PCI/L |
| Chemical: | URANIUM MDA95 | | |
| Sample Collected: | 09-OCT-12 | Findings: | 8. |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 09-OCT-12 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-OCT-12 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-OCT-12 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-OCT-12 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-OCT-12 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-NOV-12 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-NOV-12 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-NOV-12 | Findings: | 23. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-NOV-12 | Findings: | 7.9 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 20-NOV-12 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-NOV-12 | Findings: | 22. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-JAN-13 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 22-JAN-13 | Findings: | 6.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-JAN-13 | Findings: | 14. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 12-FEB-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 12-FEB-13 | Findings: | 7.9e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 12-FEB-13 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-MAR-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-MAR-13 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-APR-13 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 09-APR-13 | Findings: | 20. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-APR-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-APR-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-APR-13 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-MAY-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 21-MAY-13 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-MAY-13 | Findings: | 21. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-JUN-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 04-JUN-13 | Findings: | 2.4e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-JUN-13 | Findings: | 23. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 25-JUN-13 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 25-JUN-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-JUN-13 | Findings: | 22. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 09-JUL-13 | Findings: | 7.7 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 09-JUL-13 | Findings: | 8.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 09-JUL-13 | Findings: | 24. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 23-JUL-13 | Findings: | 8.7e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JUL-13 | Findings: | 22. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-AUG-13 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 06-AUG-13 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-AUG-13 | Findings: | 23. MG/L |
| Chemical: | NITRATE (AS NO3) | | |

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|---|---|---|---|
| Sample Collected: | 20-AUG-13 | Findings: | 7.5 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 20-AUG-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-AUG-13 | Findings: | 24. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 03-SEP-13 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-SEP-13 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 24-SEP-13 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 24-SEP-13 | Findings: | 6.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-SEP-13 | Findings: | 25. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 22-OCT-13 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 22-OCT-13 | Findings: | 25. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 05-NOV-13 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-NOV-13 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 19-NOV-13 | Findings: | 0.11 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-NOV-13 | Findings: | 26. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 03-DEC-13 | Findings: | 7.1e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 03-DEC-13 | Findings: | 29. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 31-DEC-13 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 31-DEC-13 | Findings: | 29. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-JAN-14 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 07-JAN-14 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-14 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |

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|---|---|---|---|
| Sample Collected: | 21-JAN-14 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-JAN-14 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-FEB-14 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-FEB-14 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 04-MAR-14 | Findings: | 0.13 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-MAR-14 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 18-MAR-14 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-MAR-14 | Findings: | 31. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-APR-14 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-APR-14 | Findings: | 30. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 06-MAY-14 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 06-MAY-14 | Findings: | 32. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 20-MAY-14 | Findings: | 0.18 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 20-MAY-14 | Findings: | 32. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 10-JUN-14 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 10-JUN-14 | Findings: | 32. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUL-14 | Findings: | 14.4 C |
| Chemical: | SOURCE TEMPERATURE C | | |
| Sample Collected: | 08-JUL-14 | Findings: | 430. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 08-JUL-14 | Findings: | 7.3 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 08-JUL-14 | Findings: | 150. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 08-JUL-14 | Findings: | 57. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 08-JUL-14 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 08-JUL-14 | Findings: | 0.42 |
| Chemical: | LANGELIER INDEX @ 60 C | | |
| Sample Collected: | 08-JUL-14 | Findings: | - 0.27 |
| Chemical: | LANGELIER INDEX AT SOURCE TEMP. | | |
| Sample Collected: | 08-JUL-14 | Findings: | 33. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08-JUL-14 | Findings: | 11.63 |
| Chemical: | AGGRSSIVE INDEX (CORROSIVITY) | | |
| Sample Collected: | 05-AUG-14 | Findings: | 7.8e-002 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 05-AUG-14 | Findings: | 35. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 26-AUG-14 | Findings: | 0.18 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-AUG-14 | Findings: | 34. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07-OCT-14 | Findings: | 1.1 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 07-OCT-14 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 07-OCT-14 | Findings: | 33. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 28-APR-15 | Findings: | 0.14 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 28-APR-15 | Findings: | 33. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 02-JUN-15 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 02-JUN-15 | Findings: | 36. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 23-JUN-15 | Findings: | 0.18 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 23-JUN-15 | Findings: | 35. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-JUL-15 | Findings: | 430. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 16-JUL-15 | Findings: | 7.7 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 16-JUL-15 | Findings: | 140. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 16-JUL-15 | Findings: | 170. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 16-JUL-15 | Findings: | 190. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |

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|---|---|---|---|
| Sample Collected: | 16-JUL-15 | Findings: | 62. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 16-JUL-15 | Findings: | 8.7 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 16-JUL-15 | Findings: | 11. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 16-JUL-15 | Findings: | 1.8 MG/L |
| Chemical: | POTASSIUM | | |
| Sample Collected: | 16-JUL-15 | Findings: | 9.8 MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 16-JUL-15 | Findings: | 33. MG/L |
| Chemical: | SULFATE | | |
| Sample Collected: | 16-JUL-15 | Findings: | 0.4 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 16-JUL-15 | Findings: | 3.5 UG/L |
| Chemical: | VANADIUM | | |
| Sample Collected: | 16-JUL-15 | Findings: | 300. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 16-JUL-15 | Findings: | 35. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-JUL-15 | Findings: | 8000. MG/L |
| Chemical: | NITRATE + NITRITE (AS N) | | |
| Sample Collected: | 18-AUG-15 | Findings: | 0.12 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 18-AUG-15 | Findings: | 36. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 01-SEP-15 | Findings: | 0.17 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 01-SEP-15 | Findings: | 37. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 16-SEP-15 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 16-SEP-15 | Findings: | 0.15 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 16-SEP-15 | Findings: | 39. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 29-SEP-15 | Findings: | 7.8 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 29-SEP-15 | Findings: | 0.19 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 29-SEP-15 | Findings: | 39. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 15-OCT-15 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

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|---|---|---|---|
| Sample Collected: | 15-OCT-15 | Findings: | 38. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-JAN-16 | Findings: | 0.2 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 16-MAR-16 | Findings: | 7.6 |
| Chemical: | PH, FIELD | | |
| Sample Collected: | 16-MAR-16 | Findings: | 9.5 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 16-MAR-16 | Findings: | 0.23 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 9.5 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 04-MAY-16 | Findings: | 0.29 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 9.5 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 24-MAY-16 | Findings: | 0.16 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 19-JUL-16 | Findings: | 9.8 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 19-JUL-16 | Findings: | 0.28 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 13-SEP-16 | Findings: | 9.3 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 13-SEP-16 | Findings: | 0.25 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 21-OCT-16 | Findings: | 9.6 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 21-OCT-16 | Findings: | 0.26 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 26-JAN-17 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 26-JAN-17 | Findings: | 0.25 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 15-JUL-17 | Findings: | 9.9 MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 15-JUL-17 | Findings: | 0.18 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |
| Sample Collected: | 25-JUL-17 | Findings: | 11. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 25-JUL-17 | Findings: | 0.25 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 31-OCT-17 | Findings: | 10. MG/L |
| Chemical: | NITRATE (AS N) | | |
| Sample Collected: | 31-OCT-17 | Findings: | 1.1 UG/L |
| Chemical: | CHROMIUM, HEXAVALENT | | |
| Sample Collected: | 31-OCT-17 | Findings: | 0.2 UG/L |
| Chemical: | DIBROMOCHLOROPROPANE (DBCP) | | |

---

**D20**
**East**
**1/2 - 1 Mile**
**Lower**

**CA WELLS** **324**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 01N/07W-33N01 S | User ID: | TAN |
| FRDS Number: | 3610085005 | County: | San Beernardino |
| District Number: | 13 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Standby Raw |
| Source Lat/Long: | 340700.0 1173700.0 | Precision: | Undefined |
| Source Name: | SAN ANTONIO WELL 04 - STANDBY | | |
| System Number: | 3610085 | | |
| System Name: | SAN ANTONIO WATER COMPANY | | |
| Organization That Operates System: | | | |
| | 139 N EUCLID AVE | | |
| | UPLAND, CA 91786 | | |
| Pop Served: | 2927 | Connections: | 1108 |
| Area Served: | SAN ANTONIO HEIGHTS | | |

---

**1G**
**ENE**
**1/2 - 1 Mile**
**Lower**

| | |
|---|---|
| Site ID: | 083601603T |
| Groundwater Flow: | SSE |
| Shallow Water Depth: | 355 |
| Deep Water Depth: | 376 |
| Average Water Depth: | Not Reported |
| Date: | 10/1990 |

**AQUIFLOW** **37841**

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
# RADON

**AREA RADON INFORMATION**

State Database: CA Radon

Radon Test Results

| Zipcode | Num Tests | > 4 pCi/L |
|---|---|---|
| 91786 | 23 | 2 |

Federal EPA Radon Zone for SAN BERNARDINO County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

---

Federal Area Radon Information for Zip Code: 91786

Number of sites tested: 1

| Area | Average Activity | % <4 pCi/L | % 4-20 pCi/L | % >20 pCi/L |
|---|---|---|---|---|
| Living Area - 1st Floor | 0.900 pCi/L | 100% | 0% | 0% |
| Living Area - 2nd Floor | Not Reported | Not Reported | Not Reported | Not Reported |
| Basement | Not Reported | Not Reported | Not Reported | Not Reported |

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

## HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

## HYDROGEOLOGIC INFORMATION

AQUIFLOW$^{R}$ Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

## GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

## OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

**STREET AND ADDRESS INFORMATION**

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# APPENDIX E

## PROJECT TEAM QUALIFICATIONS

# Anna M. Scott

Project Geologist

## Education

B.S., Geology, University of California, Riverside

## Professional Experience

Ms. Anna Scott has over 30 years of geotechnical experience and has worked on or managed a wide range of geotechnical projects throughout southern California, including the High Desert, Inland Empire, Antelope Valley, Coachella Valley, Orange County and Bakersfield area. Her geotechnical experience has ranged from field and laboratory technician to field, staff and project geologist. Ms. Scott's responsibilities include preparation of proposals, preliminary geotechnical investigations, seismic studies, settlement monitor installation and studies, and field studies as a technician and geologist for large grading projects. Ms. Scott has performed Phase I and II ESAs for various property acquisitions and transfers throughout southern California.

## Representative Project Experience

Ms. Scott has worked on numerous projects throughout southern California. Her experience includes working with various entities including the public and private sectors. Her vast knowledge includes geotechnical, environmental and materials services. This experience has been attained through small and large projects over the numerous years of her career.

## Employment History

**GeoTek, Inc.,** Riverside-Project Geologist, February 2005 – Present

**GeoSoils, Inc**., Santa Ana, September 1987 – February 2005

# Edward H. LaMont, CEG, PG

Branch Manager

## Areas of Expertise

Geotechnical Field Investigations
Grading and Earthwork Construction
Industry Standard of Care
Hillside, Liquefaction, Seismic Hazard, Fault Analyses and Forensic Studies.

## Education

Bachelor of Science in Geology, Cal State University, Northridge

## Registrations

Registered Geologist, PG 6025
Certified Engineering Geologist, CEG 1892

## Certifications

OSHA 40-Hr HAZWOPER Training
OSHA 8-Hour Refresher
First Aid/CPR

## Professional Affiliations

Association of Engineering Geologist
South Coast Geological Society
San Diego Association of Geologist
Inland Geological Society
BIA Riverside
BIA San Diego

## Professional Experience

Mr. LaMont has been involved with numerous public works, residential and commercial earthwork projects within the southern California area. Many residential and public works projects have been successfully completed across southern and central California. Projects include fault and subsidence studies, fault evaluations, various commercial and residential site developments, FEMA levee certifications and military construction projects. These projects have generally included preliminary geotechnical investigations, slope stability evaluations, review and design recommendations, street improvements construction and testing services, and project management.

In addition, Mr. LaMont has performed governmental review of geotechnical reports for the County of Orange. Mr. LaMont has also completed geotechnical studies for the Riverside County Flood Control and Cities of Banning, Chino, Corona, Palm Springs, Lancaster and Victorville, to name a few.

## Representative Project Experience

Project experience has included residential and commercial developments, for various land developers including Melia Homes, Meritage Homes, Frontier Enterprises, DR Horton, Integral Communities, Taylor-Morrison, Warmington Homes, Shea Homes, etc. Mr. LaMont has also completed geotechnical investigations and performed project management for numerous residential tracts and commercial facilities all across Southern California.

## Professional History

**Branch Manager/Principal Geologist** - Riverside GeoTek, Inc., 2004 to present

**Vice President, Principal Geologist** - GeoSoils, Inc., Santa Ana, 2003 to 2004

**Geotechnical Reviewer, Engineering Geologist** - County of Orange, 2001 to 2003.

**Project Geologist** - GeoSoils, Inc., Santa Ana, California, 1994 to 2001.

**Staff/Project Geologist** - GeoSoils, Inc., Carlsbad, California, 1988 to 1994.

# J. MICHAEL BATTEN, CAC, CEM, REPA

***Environmental Services Manager***

## Education

BS in Geology, California State University, Fresno 1988

## Registrations

- Certified Asbestos Consultant (CA #95-1721)
- Licensed Asbestos Abatement Consultant (NV #IJPM0655)
- Certified Environmental Manager (NV #1782)
- Asbestos Professional Inspector (IL #100-11092)
- Registered Environmental Property Assessor (#113162))
- Certified Lead Inspector Assessor (CA #4358)
- Certified Lead Inspector (EPA #LBP-I-1162326-1)
- Certified Lead Risk Assessor (EPA #LBP-R-1162326-1)

## Certifications

- AHERA Certified Asbestos Building Inspector, Management Planner, Project Designer, & Contractor/Supervisor
- EPA Accredited Lead-based Paint Inspector & Risk Assessor
- OSHA HAZWOPER certified worker & supervisor
- OSHA Construction Safety & Health (10-Hour)

## Affiliations

- American Society of Testing and Materials
- National Registry of Environmental Professionals

## Professional Experience

Mr. Batten has over 26 years of environmental experience, throughout which he has conducted and managed numerous environmental investigations, assessments, and remediations. He has prepared several NEPA assessments, USEPA EIS, and CEQA EIR reports. In addition, Mr. Batten has extensive experience in conducting asbestos and lead-based paint surveys and preparing management plans, including remediation design, for asbestos and lead present in buildings.

## Project Experience

- **Phase I Environmental Site Assessments:** Mr. Batten has conducted more than 2,000 Phase I Environmental Site Assessments in 21 states, including Brownfield studies under USEPA grants.
- **Phase II Environmental Site Assessments:** Mr. Batten has conducted more than 150 Phase II Environmental Assessments, including Brownfield studies under USEPA grants.
- **Site Characterizations and Remediations:** Mr. Batten has experience conducting numerous site characterizations and remediations, including obtaining regulatory closure.
- **NEPA Studies:** Mr. Batten has conducted more than 200 NEPA studies, including Environmental Assessments, Environmental Impact Reports/Environmental Impact Studies, in eight states. The agencies involved include USEPA, FCC, BLM, National Park Service, and California EPA.
- **Asbestos Services:** Mr. Batten has conducted over 600 asbestos surveys in several states. He has also prepared numerous Asbestos Management Plans, prepared design plans, and monitored numerous abatement projects.
- **Lead-Based Paint Services:** Mr. Batten has conducted numerous Lead-Based Paint surveys.
- **Landfills**: Mr. Batten has conducted investigations and overseen remediations on landfills in Fresno, California and Henderson, Nevada.
- **Other Services:** Mr. Batten has been called upon to conduct less usual services on occasion, including mold consultation and investigation, radon studies, vapor intrusion studies, and indoor air quality studies.

# J. MICHAEL BATTEN, continued…

## Professional History

***Environmental Services Manager.*** GeoTek, Inc., 2001 to present.

***Director of Environmental Services.*** ATC Associates, Inc., 1999 to 2001.

***Director of Operations.*** Hygienetics Environmental Services, Inc., 1997 to 1999.

***Project Manager.*** AllWest Environmental, Inc., 1996 to 1997.

***Project Manager.*** Citadel Environmental Services, Inc., 2/1996 to 9/1996.

***Project Manager***. Boelter Environmental consultants, 3/1995 to 9/1995.

***Senior Staff Geologist***. Converse Consultants, 1992 to 1995.

***Staff Geologist***. Converse Environmental West, 1991 to 1992.

***Project Geologist***. Krazan and Associates, 1990 to 1991.

***Environmental Technician***. Krazan and Associates, 1989 to 1990.

# National Registry of Environmental Professionals

For

Environmental Certifications

This is to Certify that

## Michael J Batten

having sucessfully demonstrated to the Academic Board of this organization the required level of knowledge and ability, is here by awarded the distinction of

## Registered Environmental Property Assessor

together with all rights, benefits and privileges attached thereto and that the name and title of the aforementioned registrant is today placed upon the register of the organization.

Given under our hands on this 15 day of June, 2013.

Richard A Young

Executive Director

NREP

113162

Registrant Number

This Certificate is the property of the National Registry of Environmental Professionals and must, upon demand, be returned.

# United States Environmental Protection Agency

## This is to certify that



J. Michael Batten

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

## In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires March 14, 2019

LBP-I-I162326-1

Certification #

February 29, 2016

Issued On

Adrienne Priselac, Manager, Toxics Office

Land Division

# United States Environmental Protection Agency

## This is to certify that



J. Michael Batten

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

## In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires March 14, 2019

LBP-R-I162326-1

Certification #

February 29, 2016

Issued On

Adrienne Priselac, Manager, Toxics Office

Land Division

STATE OF CALIFORNIA — Edmund G. Brown, Jr. *Governor*

DEPARTMENT OF INDUSTRIAL RELATIONS
Division of Occupational Safety and Health
Asbestos Unit
2424 Arden Way, Suite 495
Sacramento, CA 95825-2417
(916) 574-2993 Office (916) 483-0572 Fax
http://www.dir.ca.gov/dirdatabases.html actu@dir.ca.gov

505011721C 109 115

September 08, 2017

J. Michael Batten
8240 Edmond Street
Las Vegas NV 89139

Dear Certified Asbestos Consultant or Technician:

Enclosed is your certification card. **To maintain your certification, you must abide by the rules printed on the back of the certification card.**

Your certification is valid for a period of one year. If you wish to renew your certification, you must apply for renewal at least 60 days before the expiration date shown on your card. [8 CCR 341.15(h)(1)].

Please hold and do not send copies of your required AHERA refresher renewal certificates to our office until you apply for renewal of your certification.

Certificates must be kept current if you are actively working as a CAC or CSST. The grace period is only for those who are not actively working as an asbestos consultant or site surveillance technician.

Please contact our office at the above address, fax number or email; of any changes in your contact/mailing information within 15 days of the change.

Sincerely,

Jeff Ferrell
Senior Safety Engineer

Attachment: Certification Card

cc: File



California Department of
PublicHealth



IDPH
ILLINOIS DEPARTMENT OF PUBLIC HEALTH

525-535 West Jefferson Street • Springfield, Illinois 62761-0001 • www.dph.illinois.gov

**MICHAEL BATTEN**
8240 EDMOND STREET
LAS VEGAS, NV 89139

4/12/2017

ASBESTOS PROFESSIONAL LICENSE ID NUMBER: 11092

Enclosed is your Asbestos Professional License. Please note the expiration date on the card and in the image depicted below.

COPY OF THE ASBESTOS PROFESSIONAL LICENSE

Front of License

IDPH

**ASBESTOS PROFESSIONAL LICENSE**

| ID NUMBER | ISSUED | EXPIRES |
|---|---|---|
| 100 - 11092 | **4/12/2017** | 05/15/2018 |

**MICHAEL BATTEN**
8240 EDMOND STREET
LAS VEGAS, NV 89139
Environmental Health



Back of License

| ENDORSEMENTS | TC EXPIRES |
|---|---|
| INSPECTOR | 3/30/2018 |

**Alteration of this license shall result in legal action**
This license issued under authority of the State of Illinois Department of Public Health
This license is valid only when accompanied by a valid training course certificate.

If you have any questions or need further assistance, contact the Asbestos Program at (217)782-3517 or fax (217)785-5897.

Our WEB address is: dph.illinois.gov/topics-services/environmental-health-protection/asbestos
EMAIL Address: dph.asbestos@illinois.gov

# State of Nevada

## Department of Conservation and Natural Resources

### Division of Environmental Protection

This is to certify that

*Michael J Batten*

having given satisfactory evidence of the necessary qualifications as required by the Nevada Revised Statute 459.400 to 459.600, inclusive, and Nevada Administrative Code 459.970 to 459.9729, inclusive, has been granted certification as a

## Environmental Manager

in the State of Nevada

In testimony whereof, witness the signature of the Administrator and the Seal of the State of Nevada.

1782

Certification Number

Greg Lovato, Administrator

8/31/2019

Expiration Date

BRIAN SANDOVAL
*Governor*

STATE OF NEVADA

BRUCE BRESLOW
*Director*

STEVE GEORGE
*Administrator*

# STATE OF NEVADA
## DEPARTMENT OF BUSINESS AND INDUSTRY
### DIVISION OF INDUSTRIAL RELATIONS
**Occupational Safety and Health Administration**
**Asbestos Control Program**

Certifies That J. Michael Batten
Geotek Insite Inc.
is Licensed As Asbestos Abatement Consultant

License No. IJPM-655 Expiration Date 03/09/2018

Signature Of Licensee J. Michael Batten

## M&C Environmental Training

**Asbestos Inspector**
Refresher Training Course

**J. Michael Batten**

has successfully completed the Asbestos Inspector Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-06

Location: Oakland, California Expiration: March 9, 2018
Dates: March 9, 2017
Director of Training: John McGinnis

Certificate Number 41547 IR

## M&C Environmental Training

**Asbestos Contractor/Supervisor**
Refresher Training Course

**J. Michael Batten**

has successfully completed the Asbestos Contractor/Supervisor Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-04

Location: Oakland, California Expiration: September 15, 2018
Dates: September 15, 2017
Director of Training: John McGinnis

Certificate Number 42504 SR

## M&C Environmental Training

**Asbestos Management Planner**
Refresher Training Course

**J. Michael Batten**

has successfully completed the Asbestos Management Planner Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-08

Location: Oakland, California Expiration: March 9, 2018
Dates: March 9, 2017
Director of Training: John McGinnis

Certificate Number 41561 PR

## M&C Environmental Training

**Asbestos Project Designer**
Refresher Training Course

**J. Michael Batten**

has successfully completed the Asbestos Project Designer Refresher course approved by the California Division of Occupational Safety and Health for purposes of certification required by Title 8, Article 2.7 Chapter 3.2, Section 341.16 and the accreditation required under the Toxic Substances Control Act, Title II. Conducted by M&C Environmental Training, Inc., 1619 Beverly Place, Berkeley, California 94707. Tel. #(510) 525 - 1388

Course Approval Number: CA-003-10

Location: Oakland, California Expiration: September 13, 2018
Dates: September 13, 2017
Director of Training: John McGinnis

Certificate Number 42462 DR

*This is to Certify that*
**Michael Batten**
*Has Satisfactorily Completed Training in Accordance with Applicable Rules and Regulations*
**Asbestos Building Inspector**
**Refresher**
*Completed: 3/30/2017 Expires: 3/30/2018*
*Certificate: BIR1703301374*

2017 Occupational Training & Supply, Inc.
7233 Adams Street ♦ Willowbrook, IL 60527 ♦ (630) 655-3900

OSHA 002340551

U.S. Department of Labor
Occupational Safety and Health Administration

Michael Batten

has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety & Health

Kenner Costen (Trainer) 12/12/09 (Date)

# APPENDIX G1:

# DRAINAGE STUDY

# *DRAINAGE STUDY*

***FOR:***

# *Tract No. 20245*

## *City of Upland*

***PREPARED FOR:***

## *FRONTIER COMMUNITIES*

***2151 E. Convention Center Way, Suite 222***
***Ontario, CA 92882***

***PREPARED BY:***

PROACTIVE
ENGINEERING CONSULTANTS
200 South Main Street, Suite 300 ●Corona, CA 92882
PH: 951-280-3300 FAX: 951-280-0279

***Job Number 10.031***

***JUNE 13, 2019***

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Appendix A: Developed Hydrology Map

Appendix B: NOAA Atlas 14 Rainfall Data
Hydrologic Soils Group Map

Appendix C: **Rational Method Calculations**
50-Year Developed Conditions
100-Year Developed Conditions

Appendix D: **Hydraulics**
Street Capacity Hydraulics Calculations

# 1 INTRODUCTION

## 1.1 Project Description

Tract No. 20245 is located in the City of Upland, in San Bernardino County, California. Tract No. 20245 will consist of residential housing and a park area. Tract No. 20245 boundary encompasses approximately 9.2 acres. The proposed development will build 65 single family detached dwellings, streets and underground utilities within the site.

Tract No. 20245 will be built over a portion of the existing 15th Street Basin. A portion of the 15th Street Basin will be regraded and used to build the proposed residential development. Impacts to the existing 15th Street Basin are analyzed in a separately submitted drainage report prepared by Madole & Associates, dated June 12, 2017.

Onsite runoff from Tract No. 20245 will be collected and conveyed by a proposed onsite storm drain system. The onsite runoff will be collected by grated inlets within each lot and two curb inlets and conveyed to the proposed 12' x 8' RCB.

There are approximately 6.8 acres of landscape areas that currently sheet flow toward the 15th Street Basin. Once Tract No. 20245 is developed, runoff from these landscape areas will be conveyed by separate storm drain lines system and discharged to the 15th Street Basin. These existing landscape areas are identified in Exhibit A as drainage areas, Area A, Area B and Area c19.

## 1.2 Project Objectives

The objectives of this study include the following:

1. Prepare a hydrologic analysis of the developed condition based on land uses, drainage patterns, ground slopes, and soil types to generate the 100-year and 50-year flood storm events. The hydrology computations are based on the San Bernardino County Hydrology Manual.
2. Determine final storm flow rates through the project site and identify the required storm drain conveyance facilities to develop Tract No. 20245.

## 1.3 Existing Facilities

The Tract No. 20245 project site is currently used as a detention basin facility. There are several storm drain facilities within Tract No. 20245 that are currently serving the 15Th Street Basin. There is an existing 84" RCP storm drain that conveys runoff to the northwest corner of 15th Street Basin. There is an existing 48" RCP storm drain located 280' east of the Tract No. 20245 boundary. that outlets to the 15th Street Basin. A concrete gutter located approximately 70' west of the Tract No. 20245 boundary conveys runoff to the 15th Street Basin. A 102" RCP storm drain is used to dewater the 15th Street Basin. This 102" RCP storm drain inlet is located approximately 200' northwest of the Fernando Avenue and 15Th Street intersection.

## 1.4 Proposed Facilities

A section of the existing 84" RCP storm drain line will be removed. A proposed 12' x 8' RCB storm drain will extend the 84" RCP storm drain easterly along southern Tract No. 20245 boundary. The proposed 12' x 8' RCB alignment will outlet east of Tract No. 20245 and onto the 15th Street Basin.



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A section of the existing 102" RCP storm drain will be removed. A proposed 102" RCP storm drain will extend the existing 102" RCP storm drain easterly along southern Tract No. 20245 boundary. The proposed 102" RCP storm drain will parallel the proposed 12' x 8' RCB storm drain. The proposed 102" RCP storm drain will be used to dewater the 15th Street Basin.

A proposed 30" RCP storm drain line will convey runoff from an existing 48" RCP storm drain and flows from Area A. This proposed 30" RCP storm drain line is located 260' east of the western Tract No. 20245 boundary. The 30" RCP storm drain will connect to the proposed 12' x 8' RCB storm drain.

A proposed 30" RCP storm drain line will convey runoff from an existing concrete gutter located near the northeast corner of Tract No. 20245 and flows from Area B. This proposed 30" RCP storm drain line is located 70' west of the eastern Tract No. 20245 boundary. The 30" RCP storm drain will connect to the proposed 12' x 8' RCB storm drain.

Peak flow rates for the 12' x 8' RCB, 102" RCP, and two 30" RCP storm drains are provided in a separately submitted drainage report.

A proposed onsite storm drain system will be located within Tract No. 20245. The onsite system will consist of grated inlets, curb inlets, PVC and RCP pipes. The proposed storm drain layout is provided in Exhibit A, see Appendix A.

### 1.5 Flood Assessment

The Federal Emergency Management Agent (FEMA) publishes Flood, Insurance Rate Maps (FIRMs) that identify areas where there is flooding potential. The FIRM that applies to Tract No. 20245 is San Bernardino County Panel 8607 (Map Number 06071C8607H) dated August 28, 2008. The entire project site is within Flood Hazard Zone "X" – an area to be determined to be outside the 0.2% annual chance of flood plain.

## 2 HYDROLOGY

### 2.1 Methodology

The tributary drainage area boundaries were delineated utilizing digital topography provided by recent aerial topography. Detailed hydrologic parameters used in this analysis can be found in the San Bernardino County Hydrology Manual.

#### 2.1.1 General Guidelines

The following assumptions/guidelines were applied in the use of the Rational and Unit Hydrograph Methods:

- Hydrology studies were prepared using methodology outlined by the San Bernardino County Hydrology Manual. The developed condition was analyzed using the Rational Method. (See Developed Hydrology Map in Appendix A) The Rational Method is commonly used for determining peak discharge for areas less than 640 acres. The developed condition was analyzed using the rational method in order to determine peak flow rates.



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- The rational method include the effects of infiltration caused by land use and soil surface characteristics. The Hydrologic Soils Group Map Area obtained from the San Bernardino County Stormwater Facility Mapping Tool indicates that the project study area consists of soil types A. Hydrologic soil ratings are based on a scale of A through D, where D is the least pervious, providing the greatest runoff. The type of vegetation, percent ground cover, and percentage of impervious surfaces also affect the infiltration rate. See attached map in Appendix B.

- The land use type of undeveloped (average cover) was utilized for the existing and proposed landscape areas condition, commercial for proposed roads and residential (8 – 10 dwelling/acre) for proposed residential areas.

- Per criteria from the San Bernardino County Hydrology Manual, an Antecedent Moisture Condition (AMC) III was used for the 50-year and 100-year analyses that reflects the degree of ground saturation from previous rainfall events. The AMC value can range from I to III, with condition III being the most severe, allowing for greater runoff and low infiltration.

## 2.2 Rational Method

The Rational Method is an empirical computational procedure for developing peak discharge for storms of a specified recurrence interval in watersheds less than 640 acres. The formula is:

$$Q = CIA$$

Where:

Q = Peak discharge, in cubic feet per second.
C = Runoff coefficient representing the ratio of runoff depth to rainfall depth.
I = The time-averaged rainfall intensity for a storm duration equal to the time of concentration, in inches/hour (in./hr.).
A = Drainage area, in acres

### 2.2.1 Rational Method Guidelines

The following assumptions/guidelines were applied in the use of the Rational Method:

- The basic assumption for the Rational Method is that the precipitation rate is constant and uniform over the entire watershed for the time duration such that runoff could travel from the most remote point in the watershed to the concentration point; after which time the rate of runoff does not increase. This is the time defined as the "time of concentration ($T_c$)". The method is based on the assumption that the peak flow rate is directly proportional to drainage area, rainfall intensity, and a runoff coefficient "C," which is related to land use and soil type.

- Initial subareas were drawn to be less than 10 acres in size and less than 1,000 feet in length per the San Bernardino County Hydrology Manual guidelines for this procedure.



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- The hydrology calculations assumed 100 percent interception of the surface runoff at the local area drain inlets. A future hydraulics analysis of the proposed storm drain system will estimate the total intercepted flow at each area drain inlet.

#### 2.2.2 Rational Method Calculation Software

The hydrologic calculations were performed using software developed by "CIVILDESIGN" Engineering Software for the San Bernardino County Hydrology Manual. The 100-year storm event design discharge at intermediate points were computed by generating a hydrologic "link-node" model that divides the area into drainage sub-areas, each tributary to a concentration point or hydrologic "node" point determined by the existing and proposed terrain shown on the hydrology maps. Precipitation data for the project location was taken from NOAA's National Weather Service precipitation data and is provided in Appendix B of this report.

# 3 HYDRAULICS

## 3.1 Debris Potential

Since this project site is located in a basically flat valley area, the potential for debris is not a concern.

## 3.2 Storm Drain Hydraulics

The Water Surface Pressure Gradient for Windows (WSPGW) program has been used to perform the storm drain facilities flow characteristics. The WSPG program was originally developed by the Los Angeles County Flood Control District in the late 1970's (District program no. F0515) and has been modified in 1997 to a Microsoft Windows version. The Federal Emergency Management Agency (FEMA) has included the WSPG program in their list of acceptable software to model water surface elevations.

THE WSPGW program is based upon solving the Bernoulli equation for the total energy at each section using the Manning's formula for friction loss between the sections in the channel reach. The open channel flow procedure uses the Standard Step Method. Confluences, bridge piers, wall entrance and exits are analyzed using the pressure and momentum theory. The Bernoulli equation takes into account minor losses from bends, angle points, and manhole losses for pressure flow conditions. After computing a lower stage profile from the system headwork downstream to the system outlet (supercritical flow regime), and an upper stage water surface profile in the subcritical flow regime, WSPGW program will create a composite water surface profile for the entire system. Any hydraulic jumps present will be located by equating the total energy from both stages at various sections. In the reach analysis, the program automatically calculates the water surface profile at intermediate sections when the velocity head changes by more than 10%. In curved channel section, the program calculates the superelevation of the water surface level and applies a safety factor if the channel is other than rectangular, or if the flows are in the supercritical regime.

The hydraulics information will be entered into the WSPGW computer program by Civilcadd/Civildesign. Water surface elevations and velocities were calculated at specified



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junctions, reaches and outlet points. The computer files for the 100-year calculations will be included in this report during final engineering.

### 3.3 Catch Basin Hydraulics

Catch basin calculations will be prepared during final engineering and will be performed using Bentley FlowMaster, Bentley Systems Inc.

### 3.4 Street Capacity Hydraulics

Street capacity calculations are prepared using Bentley FlowMaster, Bentley Systems Inc. The section analyzed was for the typical street section at the minimum proposed street grade of 0.5%. See Appendix D for detailed calculations.

## 4 SUMMARY

The Rational Method was used to determine the peak flow rates for the 50-year and 100-year storm events for Tract No. 20245 in its developed condition. Table 1 summarizes the peak flow rates for both storm events.

The provided street capacity calculations demonstrate the 100-year storm peak flow rate will be below finish floor elevations.

This study identifies the required storm drain infrastructure as well as peak flow rates for Tract No. 20245. Hydraulic and sizing calculations for proposed storm drain infrastructure will be provided during final engineering.



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**TABLE 1**
**FLOW RATES SUMMARY (RATIONAL METHOD)**
**100 YEAR & 50 YEAR STORMS**

| | ***DEVELOPED CONDITION*** | | |
|---|---|---|---|
| **WATERSHED** | **AREA (acres)** | **100- YEAR FLOW (cfs)** | **50- YEAR FLOW (cfs)** |
| AREA A | 4.7 | 11.6 | 10.2 |
| AREA B | 2.1 | 4.4 | 3.8 |
| AREA C | 8.2 | 29.0 | 25.6 |

# *APPENDIX A*

*HYDROLOGY MAP*

Plotted: Jun 17, 2019 - 9:02am by: S_Gilbert Drawing Name: Z:\10.037_Upland_Basin_Frontier\Hydro\EXHIBITS\TPM EXHIBIT B - DEVELOPED CONDITIONS.dwg

Upland Hills Dr S

AREA 'A'

AREA 'B'

AREA 'C'

A1 1.29

A2 3.40

B1 2.08

10 1446.0 FG

39 1446.1 FG

35 1443.6 FG

30 1429.1 FG

L=383'

L=661'

L=217'

EXIST. 84" RCP SD

EXIST. 84" RCP SD TO BE REMOVED

EXIST. 48" RCP SD

12 1428.0 FL
Q50=10.2 cfs
T=15.4 min
Q100=11.6 cfs
T=15.4 min

11 1430.0 FL
Q50=2.9 cfs
T=14.4 min
Q100=3.3 cfs
T=14.4 min

21 1427.0 FL
Q50=3.8 cfs
T=19.3 min
Q100=4.4 cfs
T=19.3 min

PROP. 48" RCP SD

40 1420.2 INV
Q50=5.3 cfs
T=8.5 min
Q100=6.0 cfs
T=8.5 min

41 1421.1 INV
Q50=3.0 cfs
T=7.7 min
Q100=3.4 cfs
T=7.7 min

C19 0.55

C17 0.52

C15 0.31

C13 0.43

L=192'

L=178'

L=315'

STREET B

C7 0.19

30 1427.5 FL
1422.0 INV
Q50=1.4 cfs
T=12.2 min
Q100=1.6 cfs
T=12.2 min

L=299'

C18 0.22

C16 0.39

C14 0.23

C12 0.15

L=195'

15TH STREET BASIN

PROP. BASIN INTLET

PROP. BASIN OUTLET

90 1429.4 FG

C1 0.24

31 1421.2 INV
Q50=2.3 cfs
T=5.4 min
Q100=2.6 cfs
T=5.4 min

C3 0.54

PROP. 36" RCP SD

32 1419.6 INV
Q50=6.4 cfs
T=6.9 min
Q100=7.2 cfs
T=6.8 min

C5 0.57

C9 1.35

33 1419.4 INV
Q50=9.0 cfs
T=9.5 min
Q100=10.3 cfs
T=9.3 min

34 1418.8 INV
Q50=18.0 cfs
T=9.9 min
Q100=20.4 cfs
T=9.7 min

CB #1

37 1418.5 INV
Q50=25.6 cfs
T=10.0 min
Q100=29.0 cfs
T=9.9 min

L=172'

L=318'

L=330'

L=126'

L=62'

L=146'

STREET A

C2 0.25

EXIST. 102" RCP SD TO BE REMOVED

C4 0.56

C6 0.61

PROP. 12' X 8' RCB SD

CB #2

C8 0.26

C10 0.56

C11 0.26

PROP. 12' X 8' RCB SD

43 1418.4 INV
Q50=25.6 cfs
T=10.8 min
Q100=29.0 cfs
T=10.7 min

Map Length: 1,329.76 Feet

Ground Length: 1,329.85

34°07'04.72"

EXIST. 102" RCP SD

PROP. 102" RCP SD

PROP. 102" RCP SD

15TH ST

E 15th St

1994

HIMALAYAS CIR

NDO AVE

EGO WAY

LOS WAY

13TH AVE

ALTA AVE

VERDE AVE

## LEGEND

| | |
|---|---|
| MAJOR DRAINAGE AREA BOUNDARY | CB #1 — CATCH BASIN NUMBER |
| SUB-DRAINAGE AREA BOUNDARY | DB #1 — DETENTION BASIN NUMBER |
| L=100' — PIPE FLOW PATH WITH LENGTH | |
| L=100' — SURFACE FLOW PATH WITH LENGTH | |
| B2 / 1.21 — DRAINAGE AREA DESIGNATION / AREA IN ACRES | |
| 12 — NODE NUMBER | |
| 335.40 FS — FINISHED SURFACE ELEVATION | |
| 327.50 INV — INVERT ELEVATION | |
| Q50=1.6 cfs — FLOW RATE OF 50 YEAR STORM (cfs) | |
| Q100=1.6 cfs — FLOW RATE OF 100 YEAR STORM (cfs) | |
| T=9.8 min — TIME IN CONCENTRATION, Tc (min) | |

50' 25' 0' 50'

SCALE: 1" = 50'

# DEVELOPED HYDROLOGY MAP

## EXHIBIT A
## TRACT NO. 20245
## CITY OF UPLAND

6/13/2019

PREPARED BY:
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DEVELOPED HYDROLOGY

Plotted: Jun 17, 2019 - 9:02am by: S_Gilbert Drawing Name: Z:\10.037_Upland_Basin_Frontier\Hydro\EXHIBITS\TPM EXHIBIT B - DEVELOPED CONDITIONS.dwg

# *APPENDIX B*

# *NOAA ATLAS 14 RAINFALL DATA*

General Information
Homepage
Progress Reports
FAQ
Glossary

Precipitation Frequency
Data Server
GIS Grids
Maps
Time Series
Temporals
Documents

Probable Maximum Precipitation
Documents

Miscellaneous
Publications
Storm Analysis
Record Precipitation

Contact Us
Inquiries

# NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

## Data description

**Data type:** Precipitation depth ▼ **Units:** English ▼ **Time series type:** Partial duration ▼

## Select location

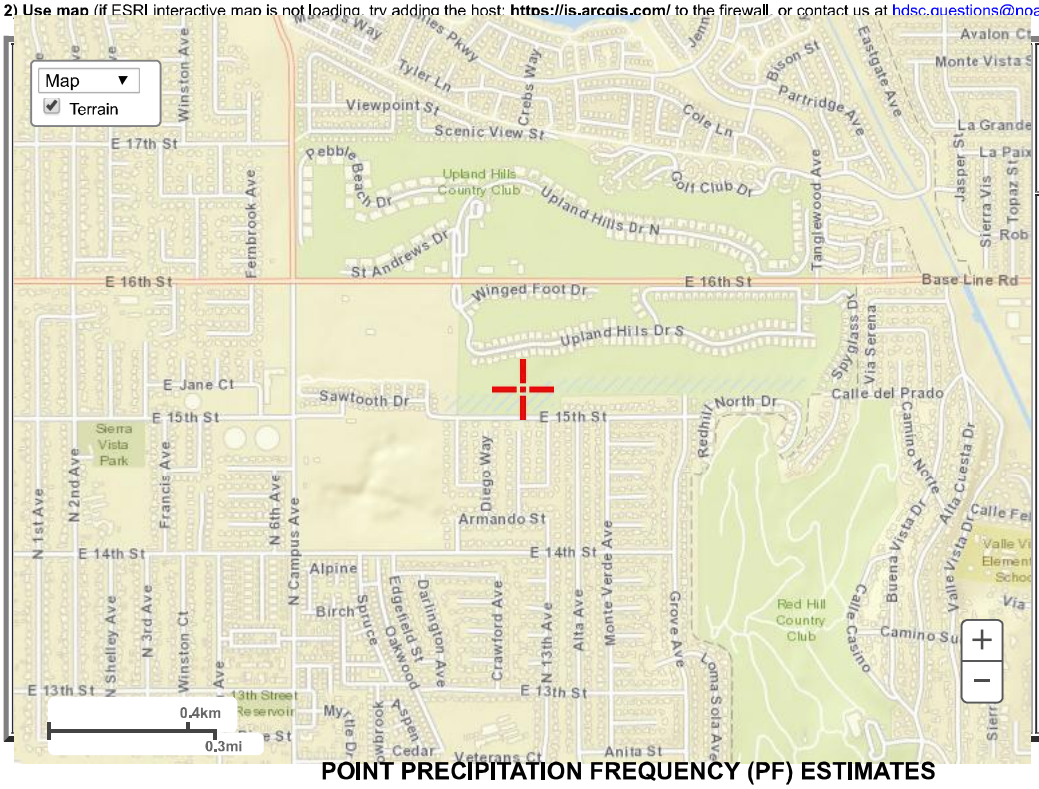
**1) Manually:**

**a) By location** (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

**b) By station** (list of CA stations): Select station ▼

**c) By address** N Himalayas Dr, Upland, CA, 91786, U

**2) Use map** (if ESRI interactive map is not loading, try adding the host: **https://is.arcgis.com/** to the firewall, or contact us at hdsc.questions@noaa.gov):




**a) Select location**
Move crosshair or double click

**b) Click on station icon**
Show stations on map

**Location information:**
**Name:** Upland, California, USA*
**Latitude:** 34.1186°
**Longitude:** -117.6341°
**Elevation:** 1431.09 ft **

* Source: ESRI Maps
** Source: USGS

## POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

**WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION**
**NOAA Atlas 14, Volume 6, Version 2**

**PF tabular** PF graphical Supplementary information Print page

**PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.124** (0.103-0.150) | **0.160** (0.133-0.194) | **0.206** (0.171-0.251) | **0.243** (0.200-0.298) | **0.293** (0.233-0.372) | **0.331** (0.257-0.430) | **0.369** (0.280-0.491) | **0.408** (0.300-0.559) | **0.460** (0.324-0.658) | **0.499** (0.340-0.741) |
| 10-min | **0.178** (0.148-0.216) | **0.229** (0.191-0.278) | **0.295** (0.245-0.359) | **0.349** (0.287-0.428) | **0.420** (0.334-0.534) | **0.474** (0.369-0.616) | **0.529** (0.401-0.704) | **0.584** (0.430-0.801) | **0.659** (0.465-0.943) | **0.716** (0.487-1.06) |
| 15-min | **0.215** (0.179-0.261) | **0.277** (0.231-0.336) | **0.357** (0.297-0.435) | **0.422** (0.347-0.517) | **0.508** (0.404-0.645) | **0.574** (0.446-0.745) | **0.640** (0.485-0.852) | **0.707** (0.521-0.969) | **0.797** (0.562-1.14) | **0.865** (0.589-1.28) |
| 30-min | **0.320** (0.267-0.387) | **0.412** (0.343-0.500) | **0.531** (0.441-0.646) | **0.626** (0.516-0.769) | **0.755** (0.600-0.959) | **0.852** (0.663-1.11) | **0.950** (0.721-1.27) | **1.05** (0.774-1.44) | **1.18** (0.835-1.70) | **1.29** (0.875-1.91) |
| 60-min | **0.489** (0.408-0.593) | **0.630** (0.524-0.764) | **0.812** (0.674-0.988) | **0.958** (0.789-1.18) | **1.16** (0.918-1.47) | **1.30** (1.01-1.69) | **1.45** (1.10-1.94) | **1.61** (1.18-2.20) | **1.81** (1.28-2.59) | **1.97** (1.34-2.92) |
| 2-hr | **0.740** (0.617-0.897) | **0.952** (0.793-1.16) | **1.22** (1.01-1.49) | **1.44** (1.18-1.76) | **1.72** (1.37-2.18) | **1.93** (1.50-2.51) | **2.14** (1.62-2.85) | **2.35** (1.73-3.22) | **2.63** (1.85-3.76) | **2.84** (1.93-4.21) |
| 3-hr | **0.935** (0.779-1.13) | **1.20** (1.00-1.46) | **1.54** (1.28-1.87) | **1.81** (1.49-2.22) | **2.15** (1.71-2.74) | **2.42** (1.88-3.14) | **2.67** (2.03-3.56) | **2.93** (2.16-4.02) | **3.27** (2.31-4.68) | **3.53** (2.40-5.23) |
| 6-hr | **1.34** | **1.73** | **2.21** | **2.59** | **3.09** | **3.47** | **3.83** | **4.20** | **4.69** | **5.05** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1.12-1.63) | (1.44-2.10) | (1.84-2.69) | (2.13-3.18) | (2.46-3.93) | (2.70-4.50) | (2.91-5.11) | (3.10-5.76) | (3.31-6.71) | (3.44-7.49) |
| 12-hr | **1.77** (1.47-2.14) | **2.29** (1.90-2.77) | **2.95** (2.44-3.59) | **3.47** (2.86-4.26) | **4.17** (3.32-5.30) | **4.70** (3.65-6.10) | **5.22** (3.96-6.95) | **5.75** (4.23-7.88) | **6.45** (4.55-9.23) | **6.98** (4.75-10.4) |
| 24-hr | **2.51** (2.22-2.90) | **3.29** (2.91-3.80) | **4.30** (3.79-4.97) | **5.12** (4.47-5.97) | **6.22** (5.27-7.50) | **7.06** (5.86-8.69) | **7.92** (6.41-9.98) | **8.80** (6.93-11.4) | **9.98** (7.55-13.5) | **10.9** (7.97-15.2) |
| 2-day | **3.10** (2.75-3.58) | **4.17** (3.69-4.82) | **5.58** (4.93-6.46) | **6.74** (5.90-7.86) | **8.32** (7.05-10.0) | **9.55** (7.92-11.8) | **10.8** (8.76-13.6) | **12.1** (9.55-15.7) | **13.9** (10.5-18.8) | **15.3** (11.2-21.4) |
| 3-day | **3.34** (2.96-3.85) | **4.58** (4.05-5.28) | **6.23** (5.49-7.20) | **7.58** (6.63-8.85) | **9.46** (8.01-11.4) | **10.9** (9.06-13.4) | **12.4** (10.1-15.7) | **14.0** (11.0-18.1) | **16.2** (12.2-21.8) | **17.9** (13.1-25.0) |
| 4-day | **3.61** (3.19-4.16) | **5.00** (4.42-5.77) | **6.87** (6.05-7.94) | **8.41** (7.36-9.81) | **10.5** (8.93-12.7) | **12.2** (10.1-15.0) | **13.9** (11.3-17.6) | **15.8** (12.4-20.4) | **18.3** (13.8-24.6) | **20.3** (14.8-28.3) |
| 7-day | **4.10** (3.63-4.73) | **5.76** (5.10-6.65) | **8.00** (7.06-9.26) | **9.87** (8.64-11.5) | **12.5** (10.6-15.0) | **14.5** (12.1-17.9) | **16.7** (13.5-21.0) | **18.9** (14.9-24.5) | **22.1** (16.7-29.8) | **24.6** (18.0-34.3) |
| 10-day | **4.43** (3.92-5.10) | **6.26** (5.54-7.23) | **8.74** (7.71-10.1) | **10.8** (9.47-12.6) | **13.7** (11.6-16.6) | **16.0** (13.3-19.7) | **18.5** (14.9-23.3) | **21.0** (16.5-27.2) | **24.6** (18.6-33.1) | **27.4** (20.0-38.3) |
| 20-day | **5.31** (4.70-6.12) | **7.59** (6.71-8.76) | **10.7** (9.43-12.4) | **13.3** (11.6-15.5) | **17.0** (14.4-20.5) | **19.9** (16.5-24.5) | **23.0** (18.6-29.0) | **26.3** (20.7-34.1) | **30.9** (23.4-41.7) | **34.6** (25.3-48.3) |
| 30-day | **6.23** (5.52-7.19) | **8.88** (7.85-10.3) | **12.5** (11.0-14.5) | **15.6** (13.6-18.2) | **19.9** (16.9-24.0) | **23.4** (19.4-28.8) | **27.0** (21.9-34.1) | **30.9** (24.4-40.1) | **36.4** (27.6-49.2) | **40.9** (29.9-57.1) |
| 45-day | **7.47** (6.61-8.61) | **10.5** (9.29-12.1) | **14.7** (12.9-17.0) | **18.2** (15.9-21.2) | **23.2** (19.7-28.0) | **27.3** (22.6-33.5) | **31.5** (25.5-39.7) | **36.1** (28.4-46.7) | **42.6** (32.2-57.4) | **47.8** (34.9-66.7) |
| 60-day | **8.75** (7.74-10.1) | **12.1** (10.7-13.9) | **16.7** (14.7-19.3) | **20.6** (18.0-24.0) | **26.1** (22.1-31.5) | **30.6** (25.4-37.7) | **35.4** (28.7-44.6) | **40.5** (31.9-52.4) | **47.7** (36.1-64.4) | **53.6** (39.2-74.8) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates ▼ Submit

Main Link Categories:
Home | OWP

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: HDSC webmaster
Page last modified: April 21, 2017

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# *HYDROLOGIC SOILS GROUP MAP*




Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 10, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 10, 2018—Jun 5, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| SpC | Soboba stony loamy sand, 2 to 9 percent slopes | A | 10.2 | 100.0% |
| **Totals for Area of Interest** | | | **10.2** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# *APPENDIX C*

# *RATIONAL METHOD CALCULATIONS*

San Bernardino County Rational Hydrology Program

AREA A
50-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

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UPLAND PROJECT
50-YEAR STORM
DEVELOPED CONDITION

---

Program License Serial Number 6094

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 50.0
Computed rainfall intensity:
Storm year = 50.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Initial subarea data:
Initial area flow distance = 383.000(Ft.)
Top (of initial area) elevation = 1446.000(Ft.)
Bottom (of initial area) elevation = 1430.000(Ft.)
Difference in elevation = 16.000(Ft.)
Slope = 0.04178 s(%)= 4.18
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.385 min.
Rainfall intensity = 3.063(In/Hr) for a 50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.744
Subarea runoff = 2.938(CFS)
Total initial stream area = 1.290(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.532(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 11.000 to Point/Station 12.000
**** IMPROVED CHANNEL TRAVEL TIME ****

---

```
Upstream point elevation =  1430.000(Ft.)
Downstream point elevation =  1429.100(Ft.)
Channel length thru subarea  =   217.000(Ft.)
Channel base width     =    1.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      6.585(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      6.585(CFS)
Depth of flow =   0.738(Ft.), Average velocity =   3.605(Ft/s)
Channel flow top width =    3.951(Ft.)
Flow Velocity =    3.61(Ft/s)
Travel time  =    1.00 min.
Time of concentration =   15.39 min.
Critical depth =      0.711(Ft.)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Rainfall intensity =      2.941(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.737
Subarea runoff =      7.230(CFS) for    3.400(Ac.)
Total runoff =     10.167(CFS)
Effective area this stream =        4.69(Ac.)
Total Study Area (Main Stream No. 1) =        4.69(Ac.)
Area averaged Fm value =    0.532(In/Hr)
Depth of flow =   0.901(Ft.), Average velocity =   4.029(Ft/s)
Critical depth =      0.883(Ft.)
End of computations, Total Study Area =            4.69 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  50.0
```

San Bernardino County Rational Hydrology Program

AREA A
100-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

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UPLAND PROJECT
100-YEAR STORM
DEVELOPED CONDITION

---

Program License Serial Number 6094

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.450 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Initial subarea data:
Initial area flow distance = 383.000(Ft.)
Top (of initial area) elevation = 1446.000(Ft.)
Bottom (of initial area) elevation = 1430.000(Ft.)
Difference in elevation = 16.000(Ft.)
Slope = 0.04178 s(%)= 4.18
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.385 min.
Rainfall intensity = 3.416(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.760
Subarea runoff = 3.348(CFS)
Total initial stream area = 1.290(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.532(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 11.000 to Point/Station 12.000
**** IMPROVED CHANNEL TRAVEL TIME ****

---

```
Upstream point elevation =  1430.000(Ft.)
Downstream point elevation =  1429.100(Ft.)
Channel length thru subarea  =   217.000(Ft.)
Channel base width     =    1.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      7.518(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      7.518(CFS)
Depth of flow =   0.785(Ft.), Average velocity =   3.730(Ft/s)
Channel flow top width =    4.138(Ft.)
Flow Velocity =    3.73(Ft/s)
Travel time  =    0.97 min.
Time of concentration =   15.35 min.
Critical depth =      0.762(Ft.)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Rainfall intensity =      3.285(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.754
Subarea runoff =      8.270(CFS) for    3.400(Ac.)
Total runoff =     11.618(CFS)
Effective area this stream =        4.69(Ac.)
Total Study Area (Main Stream No. 1) =        4.69(Ac.)
Area averaged Fm value =    0.532(In/Hr)
Depth of flow =   0.957(Ft.), Average velocity =   4.168(Ft/s)
Critical depth =      0.938(Ft.)
End of computations, Total Study Area =            4.69 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  50.0
```

San Bernardino County Rational Hydrology Program

AREA B
50-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

---

UPLAND PROJECT
50-YEAR STORM
DEVELOPED CONDITION

---

Program License Serial Number 6094

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 50.0
Computed rainfall intensity:
Storm year = 50.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Initial subarea data:
Initial area flow distance = 661.000(Ft.)
Top (of initial area) elevation = 1446.100(Ft.)
Bottom (of initial area) elevation = 1427.000(Ft.)
Difference in elevation = 19.100(Ft.)
Slope = 0.02890 s(%)= 2.89
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 19.263 min.
Rainfall intensity = 2.570(In/Hr) for a 50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.714
Subarea runoff = 3.815(CFS)
Total initial stream area = 2.080(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.532(In/Hr)
End of computations, Total Study Area = 2.08 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

```
Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  50.0
```

San Bernardino County Rational Hydrology Program

AREA B
100-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

---

UPLAND PROJECT
100-YEAR STORM
DEVELOPED CONDITION

---

Program License Serial Number 6094

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.450 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Initial subarea data:
Initial area flow distance = 661.000(Ft.)
Top (of initial area) elevation = 1446.100(Ft.)
Bottom (of initial area) elevation = 1427.000(Ft.)
Difference in elevation = 19.100(Ft.)
Slope = 0.02890 s(%)= 2.89
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 19.263 min.
Rainfall intensity = 2.867(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.733
Subarea runoff = 4.370(CFS)
Total initial stream area = 2.080(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.532(In/Hr)
End of computations, Total Study Area = 2.08 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

```
Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  50.0
```

San Bernardino County Rational Hydrology Program

AREA C
50-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

---

UPLAND PROJECT
50-YEAR STORM
DEVELOPED CONDITION

---

Program License Serial Number 6094

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 50.0
Computed rainfall intensity:
Storm year = 50.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

---

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.314(In/Hr)
Initial subarea data:
Initial area flow distance = 172.000(Ft.)
Top (of initial area) elevation = 1429.100(Ft.)
Bottom (of initial area) elevation = 1421.200(Ft.)
Difference in elevation = 7.900(Ft.)
Slope = 0.04593 s(%)= 4.59
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.428 min.
Rainfall intensity = 5.496(In/Hr) for a 50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.849
Subarea runoff = 1.119(CFS)
Total initial stream area = 0.240(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.314(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 30.000 to Point/Station 31.000
**** SUBAREA FLOW ADDITION ****

---

```
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     5.43 min.
Rainfall intensity =      5.496(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.849
Subarea runoff =      1.166(CFS) for    0.250(Ac.)
Total runoff =      2.285(CFS)
Effective area this stream =        0.49(Ac.)
Total Study Area (Main Stream No. 1) =        0.49(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1421.200(Ft.)
Downstream point/station elevation =  1419.600(Ft.)
Pipe length  =   318.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.285(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.285(CFS)
Normal flow depth in pipe =    8.93(In.)
Flow top width inside pipe =   10.47(In.)
Critical Depth =    7.75(In.)
Pipe flow velocity =      3.64(Ft/s)
Travel time through pipe =    1.45 min.
Time of concentration (TC) =     6.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     6.88 min.
Rainfall intensity =      4.766(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.841
Subarea runoff =      1.842(CFS) for    0.540(Ac.)
Total runoff =      4.127(CFS)
Effective area this stream =        1.03(Ac.)
Total Study Area (Main Stream No. 1) =        1.03(Ac.)
Area averaged Fm value =    0.314(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     6.88 min.
Rainfall intensity =      4.766(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.841
Subarea runoff =      2.244(CFS) for    0.560(Ac.)
Total runoff =      6.371(CFS)
Effective area this stream =        1.59(Ac.)
Total Study Area (Main Stream No. 1) =        1.59(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       33.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1419.600(Ft.)
Downstream point/station elevation =  1419.400(Ft.)
Pipe length  =   330.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.371(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =     6.371(CFS)
Normal flow depth in pipe =   18.87(In.)
Flow top width inside pipe =   24.77(In.)
Critical Depth =   10.34(In.)
Pipe flow velocity =      2.15(Ft/s)
Travel time through pipe =    2.56 min.
Time of concentration (TC) =     9.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       33.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.45 min.
Rainfall intensity =      3.942(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.828
Subarea runoff =      0.682(CFS) for    0.570(Ac.)
Total runoff =      7.052(CFS)
Effective area this stream =        2.16(Ac.)
```

```
Total Study Area (Main Stream No. 1) =        2.16(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       33.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.45 min.
Rainfall intensity =      3.942(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.828
Subarea runoff =      1.992(CFS) for    0.610(Ac.)
Total runoff =      9.044(CFS)
Effective area this stream =        2.77(Ac.)
Total Study Area (Main Stream No. 1) =        2.77(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1419.400(Ft.)
Downstream point/station elevation =  1418.800(Ft.)
Pipe length  =   126.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.044(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.044(CFS)
Normal flow depth in pipe =   14.55(In.)
Flow top width inside pipe =   19.37(In.)
Critical Depth =   13.40(In.)
Pipe flow velocity =      5.08(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =     9.86 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.86 min.
Rainfall intensity =      3.842(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.826
Subarea runoff =      0.354(CFS) for    0.190(Ac.)
Total runoff =      9.398(CFS)
Effective area this stream =        2.96(Ac.)
Total Study Area (Main Stream No. 1) =        2.96(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.86 min.
Rainfall intensity =      3.842(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.826
Subarea runoff =      0.825(CFS) for    0.260(Ac.)
Total runoff =     10.223(CFS)
Effective area this stream =        3.22(Ac.)
Total Study Area (Main Stream No. 1) =        3.22(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     9.86 min.
Rainfall intensity =      3.842(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.843
Subarea runoff =      4.572(CFS) for    1.350(Ac.)
Total runoff =     14.796(CFS)
Effective area this stream =        4.57(Ac.)
Total Study Area (Main Stream No. 1) =        4.57(Ac.)
Area averaged Fm value =    0.244(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     9.86 min.
Rainfall intensity =      3.842(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.847
Subarea runoff =      1.897(CFS) for    0.560(Ac.)
Total runoff =     16.693(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        5.13(Ac.)
Area averaged Fm value =    0.226(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.130(Ac.)
Runoff from this stream =     16.693(CFS)
Time of concentration =    9.86 min.
Rainfall intensity =     3.842(In/Hr)
Area averaged loss rate (Fm) =    0.2264(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2883
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       35.000 to Point/Station       36.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Initial subarea data:
Initial area flow distance =   292.000(Ft.)
Top (of initial area) elevation =  1443.600(Ft.)
Bottom (of initial area) elevation =  1427.500(Ft.)
Difference in elevation =    16.100(Ft.)
Slope =    0.05514  s(%)=       5.51
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.209 min.
Rainfall intensity =      3.379(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.758
Subarea runoff =      1.409(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.532(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1422.000(Ft.)
Downstream point/station elevation =  1418.800(Ft.)
Pipe length  =   195.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.409(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.409(CFS)
Normal flow depth in pipe =    5.37(In.)
Flow top width inside pipe =    8.83(In.)
Critical Depth =    6.56(In.)
Pipe flow velocity =      5.13(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    12.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       34.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.550(Ac.)
Runoff from this stream =      1.409(CFS)
Time of concentration =   12.84 min.
Rainfall intensity =     3.278(In/Hr)
Area averaged loss rate (Fm) =    0.5325(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     16.69     5.130      9.86    0.226      3.842
2      1.41     0.550     12.84    0.532      3.278
Qmax(1) =
         1.000 *    1.000 *    16.693) +
         1.205 *    0.768 *     1.409) + =      17.996
Qmax(2) =
         0.844 *    1.000 *    16.693) +
         1.000 *    1.000 *     1.409) + =      15.500

Total of 2 main streams to confluence:
Flow rates before confluence point:
      17.693       2.409
Maximum flow rates at confluence using above data:
       17.996       15.500
Area of streams before confluence:
        5.130        0.550
Effective area values after confluence:
        5.552        5.680


Results of confluence:
Total flow rate =     17.996(CFS)
Time of concentration =     9.859 min.
Effective stream area after confluence  =      5.552(Ac.)
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Study area average Pervious fraction(Ap) =  0.357
Study area average soil loss rate(Fm) =    0.256(In/Hr)
Study area total =       5.68(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1418.800(Ft.)
Downstream point/station elevation =  1418.500(Ft.)
Pipe length  =    62.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.996(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    17.996(CFS)
Normal flow depth in pipe =   18.87(In.)
Flow top width inside pipe =   24.77(In.)
Critical Depth =   17.78(In.)
Pipe flow velocity =      6.06(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    10.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =    10.03 min.
Rainfall intensity =      3.803(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.839
Subarea runoff =      0.542(CFS) for    0.260(Ac.)
Total runoff =     18.538(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        5.94(Ac.)
Area averaged Fm value =    0.259(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.812(Ac.)
Runoff from this stream =     18.538(CFS)
Time of concentration =   10.03 min.
Rainfall intensity =     3.803(In/Hr)
Area averaged loss rate (Fm) =    0.2586(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3591
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Initial subarea data:
Initial area flow distance =   315.000(Ft.)
Top (of initial area) elevation =  1429.400(Ft.)
Bottom (of initial area) elevation =  1421.100(Ft.)
Difference in elevation =     8.300(Ft.)
Slope =    0.02635  s(%)=       2.63
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.728 min.
Rainfall intensity =      4.446(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.836
Subarea runoff =      0.558(CFS)
Total initial stream area =        0.150(Ac.)
Pervious area fraction = 0.400
Initial area Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     7.73 min.
Rainfall intensity =      4.446(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.836
Subarea runoff =      1.599(CFS) for    0.430(Ac.)
Total runoff =      2.157(CFS)
Effective area this stream =        0.58(Ac.)
Total Study Area (Main Stream No. 2) =        6.52(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
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```
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     7.73 min.
Rainfall intensity =      4.446(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.836
Subarea runoff =      0.855(CFS) for    0.230(Ac.)
Total runoff =      3.012(CFS)
Effective area this stream =        0.81(Ac.)
Total Study Area (Main Stream No. 2) =        6.75(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1421.100(Ft.)
Downstream point/station elevation =  1420.200(Ft.)
Pipe length  =   178.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.012(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.012(CFS)
Normal flow depth in pipe =    8.86(In.)
Flow top width inside pipe =   14.75(In.)
Critical Depth =    8.38(In.)
Pipe flow velocity =      3.99(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =     8.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       42.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     8.47 min.
Rainfall intensity =      4.208(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.833
Subarea runoff =      0.913(CFS) for    0.310(Ac.)
Total runoff =      3.925(CFS)
Effective area this stream =        1.12(Ac.)
Total Study Area (Main Stream No. 2) =        7.06(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       42.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

```
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     8.47 min.
Rainfall intensity =      4.208(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.833
Subarea runoff =      1.367(CFS) for    0.390(Ac.)
Total runoff =      5.292(CFS)
Effective area this stream =        1.51(Ac.)
Total Study Area (Main Stream No. 2) =        7.45(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1420.200(Ft.)
Downstream point/station elevation =  1418.500(Ft.)
Pipe length  =   299.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.292(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.292(CFS)
Normal flow depth in pipe =   10.76(In.)
Flow top width inside pipe =   17.65(In.)
Critical Depth =   10.63(In.)
Pipe flow velocity =      4.80(Ft/s)
Travel time through pipe =    1.04 min.
Time of concentration (TC) =     9.51 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.51 min.
Rainfall intensity =      3.926(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.828
Subarea runoff =      1.307(CFS) for    0.520(Ac.)
Total runoff =      6.599(CFS)
Effective area this stream =        2.03(Ac.)
Total Study Area (Main Stream No. 2) =        7.97(Ac.)
Area averaged Fm value =    0.314(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Time of concentration =     9.51 min.
Rainfall intensity =      3.926(In/Hr) for a    50.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.823
Subarea runoff =      0.672(CFS) for    0.220(Ac.)
Total runoff =      7.271(CFS)
Effective area this stream =        2.25(Ac.)
Total Study Area (Main Stream No. 2) =        8.19(Ac.)
Area averaged Fm value =    0.335(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.250(Ac.)
Runoff from this stream =      7.271(CFS)
Time of concentration =    9.51 min.
Rainfall intensity =     3.926(In/Hr)
Area averaged loss rate (Fm) =    0.3354(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4587
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     18.54     5.812     10.03    0.259      3.803
2      7.27     2.250      9.51    0.335      3.926
Qmax(1) =
         1.000 *    1.000 *    18.538) +
         0.966 *    1.000 *     7.271) + =      25.559
Qmax(2) =
         1.035 *    0.948 *    18.538) +
         1.000 *    1.000 *     7.271) + =      25.460

Total of 2 main streams to confluence:
Flow rates before confluence point:
      19.538       8.271
Maximum flow rates at confluence using above data:
       25.559       25.460
Area of streams before confluence:
        5.812        2.250
Effective area values after confluence:
        8.062        7.761
```

```
Results of confluence:
Total flow rate =     25.559(CFS)
Time of concentration =    10.029 min.
Effective stream area after confluence  =      8.062(Ac.)
Study area average Pervious fraction(Ap) =  0.387
Study area average soil loss rate(Fm) =    0.280(In/Hr)
Study area total =       8.06(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1418.500(Ft.)
Downstream point/station elevation =  1418.400(Ft.)
Pipe length  =   146.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.559(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    25.559(CFS)
Normal flow depth in pipe =   33.38(In.)
Flow top width inside pipe =   33.93(In.)
Critical Depth =   18.67(In.)
Pipe flow velocity =      3.12(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    10.81 min.
End of computations, Total Study Area =            8.19 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.386
Area averaged SCS curve number =  33.7
```

San Bernardino County Rational Hydrology Program

AREA C
100-YEAR

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/11/18

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UPLAND PROJECT
100-YEAR STORM
DEVELOPED CONDITION

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Program License Serial Number 6094

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.450 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

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RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.314(In/Hr)
Initial subarea data:
Initial area flow distance = 172.000(Ft.)
Top (of initial area) elevation = 1429.100(Ft.)
Bottom (of initial area) elevation = 1421.200(Ft.)
Difference in elevation = 7.900(Ft.)
Slope = 0.04593 s(%)= 4.59
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.428 min.
Rainfall intensity = 6.130(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.854
Subarea runoff = 1.256(CFS)
Total initial stream area = 0.240(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.314(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 30.000 to Point/Station 31.000
**** SUBAREA FLOW ADDITION ****

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RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     5.43 min.
Rainfall intensity =      6.130(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.854
Subarea runoff =      1.309(CFS) for    0.250(Ac.)
Total runoff =      2.565(CFS)
Effective area this stream =        0.49(Ac.)
Total Study Area (Main Stream No. 1) =        0.49(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       31.000 to Point/Station       32.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1421.200(Ft.)
Downstream point/station elevation =  1419.600(Ft.)
Pipe length  =   318.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.565(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.565(CFS)
Normal flow depth in pipe =    8.03(In.)
Flow top width inside pipe =   14.96(In.)
Critical Depth =    7.70(In.)
Pipe flow velocity =      3.84(Ft/s)
Travel time through pipe =    1.38 min.
Time of concentration (TC) =     6.81 min.


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Process from Point/Station       31.000 to Point/Station       32.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     6.81 min.
Rainfall intensity =      5.351(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.847
Subarea runoff =      2.104(CFS) for    0.540(Ac.)
Total runoff =      4.669(CFS)
Effective area this stream =        1.03(Ac.)
Total Study Area (Main Stream No. 1) =        1.03(Ac.)
Area averaged Fm value =    0.314(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     6.81 min.
Rainfall intensity =      5.351(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.847
Subarea runoff =      2.539(CFS) for    0.560(Ac.)
Total runoff =      7.208(CFS)
Effective area this stream =        1.59(Ac.)
Total Study Area (Main Stream No. 1) =        1.59(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       32.000 to Point/Station       33.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =  1419.600(Ft.)
Downstream point/station elevation =  1419.400(Ft.)
Pipe length  =   330.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.208(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =     7.208(CFS)
Normal flow depth in pipe =   20.91(In.)
Flow top width inside pipe =   22.57(In.)
Critical Depth =   11.03(In.)
Pipe flow velocity =      2.18(Ft/s)
Travel time through pipe =    2.52 min.
Time of concentration (TC) =     9.33 min.


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Process from Point/Station       32.000 to Point/Station       33.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.33 min.
Rainfall intensity =      4.429(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.836
Subarea runoff =      0.792(CFS) for    0.570(Ac.)
Total runoff =      8.000(CFS)
Effective area this stream =        2.16(Ac.)
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Total Study Area (Main Stream No. 1) =        2.16(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       32.000 to Point/Station       33.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.33 min.
Rainfall intensity =      4.429(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.836
Subarea runoff =      2.259(CFS) for    0.610(Ac.)
Total runoff =     10.259(CFS)
Effective area this stream =        2.77(Ac.)
Total Study Area (Main Stream No. 1) =        2.77(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       33.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1419.400(Ft.)
Downstream point/station elevation =  1418.800(Ft.)
Pipe length  =   126.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.259(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.259(CFS)
Normal flow depth in pipe =   16.15(In.)
Flow top width inside pipe =   17.70(In.)
Critical Depth =   14.32(In.)
Pipe flow velocity =      5.17(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =     9.74 min.


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Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.74 min.
Rainfall intensity =      4.317(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
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rational method)(Q=KCIA) is C = 0.835
Subarea runoff =      0.406(CFS) for    0.190(Ac.)
Total runoff =     10.665(CFS)
Effective area this stream =        2.96(Ac.)
Total Study Area (Main Stream No. 1) =        2.96(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.74 min.
Rainfall intensity =      4.317(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.835
Subarea runoff =      0.937(CFS) for    0.260(Ac.)
Total runoff =     11.601(CFS)
Effective area this stream =        3.22(Ac.)
Total Study Area (Main Stream No. 1) =        3.22(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     9.74 min.
Rainfall intensity =      4.317(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.849
Subarea runoff =      5.150(CFS) for    1.350(Ac.)
Total runoff =     16.752(CFS)
Effective area this stream =        4.57(Ac.)
Total Study Area (Main Stream No. 1) =        4.57(Ac.)
Area averaged Fm value =    0.244(In/Hr)


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Process from Point/Station       33.000 to Point/Station       34.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     9.74 min.
Rainfall intensity =      4.317(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.853
Subarea runoff =      2.136(CFS) for    0.560(Ac.)
Total runoff =     18.888(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        5.13(Ac.)
Area averaged Fm value =    0.226(In/Hr)


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Process from Point/Station       33.000 to Point/Station       34.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.130(Ac.)
Runoff from this stream =     18.888(CFS)
Time of concentration =    9.74 min.
Rainfall intensity =     4.317(In/Hr)
Area averaged loss rate (Fm) =    0.2264(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2883
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       35.000 to Point/Station       36.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Initial subarea data:
Initial area flow distance =   292.000(Ft.)
Top (of initial area) elevation =  1443.600(Ft.)
Bottom (of initial area) elevation =  1427.500(Ft.)
Difference in elevation =    16.100(Ft.)
Slope =    0.05514  s(%)=       5.51
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.209 min.
Rainfall intensity =      3.769(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.773
Subarea runoff =      1.602(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.532(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       34.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1422.000(Ft.)
Downstream point/station elevation =  1418.800(Ft.)
Pipe length  =   195.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.602(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.602(CFS)
Normal flow depth in pipe =    5.85(In.)
Flow top width inside pipe =    8.59(In.)
Critical Depth =    6.98(In.)
Pipe flow velocity =      5.27(Ft/s)
Travel time through pipe =    0.62 min.
Time of concentration (TC) =    12.83 min.


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Process from Point/Station       36.000 to Point/Station       34.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.550(Ac.)
Runoff from this stream =      1.602(CFS)
Time of concentration =   12.83 min.
Rainfall intensity =     3.660(In/Hr)
Area averaged loss rate (Fm) =    0.5325(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     18.89     5.130      9.74    0.226      4.317
2      1.60     0.550     12.83    0.532      3.660
Qmax(1) =
         1.000 *    1.000 *    18.888) +
         1.210 *    0.759 *     1.602) + =      20.360
Qmax(2) =
         0.839 *    1.000 *    18.888) +
         1.000 *    1.000 *     1.602) + =      17.453

Total of 2 main streams to confluence:
Flow rates before confluence point:
      19.888       2.602
Maximum flow rates at confluence using above data:
       20.360       17.453
Area of streams before confluence:
        5.130        0.550
Effective area values after confluence:
        5.548        5.680


Results of confluence:
Total flow rate =     20.360(CFS)
Time of concentration =     9.737 min.
Effective stream area after confluence  =      5.548(Ac.)
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Study area average Pervious fraction(Ap) =  0.357
Study area average soil loss rate(Fm) =    0.256(In/Hr)
Study area total =       5.68(Ac.)


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Process from Point/Station       34.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1418.800(Ft.)
Downstream point/station elevation =  1418.500(Ft.)
Pipe length  =    62.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.360(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.360(CFS)
Normal flow depth in pipe =   20.91(In.)
Flow top width inside pipe =   22.57(In.)
Critical Depth =   18.96(In.)
Pipe flow velocity =      6.16(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     9.90 min.


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Process from Point/Station       34.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.90 min.
Rainfall intensity =      4.273(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.846
Subarea runoff =      0.624(CFS) for    0.260(Ac.)
Total runoff =     20.984(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        5.94(Ac.)
Area averaged Fm value =    0.259(In/Hr)


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Process from Point/Station       34.000 to Point/Station       37.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.808(Ac.)
Runoff from this stream =     20.984(CFS)
Time of concentration =    9.90 min.
Rainfall intensity =     4.273(In/Hr)
Area averaged loss rate (Fm) =    0.2586(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3591
Program is now starting with Main Stream No. 2
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Process from Point/Station       40.000 to Point/Station       41.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Initial subarea data:
Initial area flow distance =   315.000(Ft.)
Top (of initial area) elevation =  1429.400(Ft.)
Bottom (of initial area) elevation =  1421.100(Ft.)
Difference in elevation =     8.300(Ft.)
Slope =    0.02635  s(%)=       2.63
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.728 min.
Rainfall intensity =      4.959(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.843
Subarea runoff =      0.627(CFS)
Total initial stream area =        0.150(Ac.)
Pervious area fraction = 0.400
Initial area Fm value =    0.314(In/Hr)


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Process from Point/Station       40.000 to Point/Station       41.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     7.73 min.
Rainfall intensity =      4.959(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.843
Subarea runoff =      1.798(CFS) for    0.430(Ac.)
Total runoff =      2.425(CFS)
Effective area this stream =        0.58(Ac.)
Total Study Area (Main Stream No. 2) =        6.52(Ac.)
Area averaged Fm value =    0.314(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
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Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     7.73 min.
Rainfall intensity =      4.959(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.843
Subarea runoff =      0.962(CFS) for    0.230(Ac.)
Total runoff =      3.386(CFS)
Effective area this stream =        0.81(Ac.)
Total Study Area (Main Stream No. 2) =        6.75(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       41.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1421.100(Ft.)
Downstream point/station elevation =  1420.200(Ft.)
Pipe length  =   178.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.386(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.386(CFS)
Normal flow depth in pipe =    9.57(In.)
Flow top width inside pipe =   14.41(In.)
Critical Depth =    8.91(In.)
Pipe flow velocity =      4.09(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =     8.45 min.


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Process from Point/Station       41.000 to Point/Station       42.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     8.45 min.
Rainfall intensity =      4.700(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.840
Subarea runoff =      1.034(CFS) for    0.310(Ac.)
Total runoff =      4.421(CFS)
Effective area this stream =        1.12(Ac.)
Total Study Area (Main Stream No. 2) =        7.06(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       41.000 to Point/Station       42.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     8.45 min.
Rainfall intensity =      4.700(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.840
Subarea runoff =      1.539(CFS) for    0.390(Ac.)
Total runoff =      5.960(CFS)
Effective area this stream =        1.51(Ac.)
Total Study Area (Main Stream No. 2) =        7.45(Ac.)
Area averaged Fm value =    0.314(In/Hr)


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Process from Point/Station       42.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1420.200(Ft.)
Downstream point/station elevation =  1418.500(Ft.)
Pipe length  =   299.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.960(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.960(CFS)
Normal flow depth in pipe =   11.66(In.)
Flow top width inside pipe =   17.20(In.)
Critical Depth =   11.32(In.)
Pipe flow velocity =      4.92(Ft/s)
Travel time through pipe =    1.01 min.
Time of concentration (TC) =     9.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.314(In/Hr)
Time of concentration =     9.46 min.
Rainfall intensity =      4.391(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.836
Subarea runoff =      1.489(CFS) for    0.520(Ac.)
Total runoff =      7.449(CFS)
Effective area this stream =        2.03(Ac.)
Total Study Area (Main Stream No. 2) =        7.97(Ac.)
Area averaged Fm value =    0.314(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532(In/Hr)
Time of concentration =     9.46 min.
Rainfall intensity =      4.391(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.831
Subarea runoff =      0.764(CFS) for    0.220(Ac.)
Total runoff =      8.213(CFS)
Effective area this stream =        2.25(Ac.)
Total Study Area (Main Stream No. 2) =        8.19(Ac.)
Area averaged Fm value =    0.335(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       37.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.250(Ac.)
Runoff from this stream =      8.213(CFS)
Time of concentration =    9.46 min.
Rainfall intensity =     4.391(In/Hr)
Area averaged loss rate (Fm) =    0.3354(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4587
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     20.98     5.808      9.90    0.259      4.273
2      8.21     2.250      9.46    0.335      4.391
Qmax(1) =
         1.000 *    1.000 *    20.984) +
         0.971 *    1.000 *     8.213) + =      28.958
Qmax(2) =
         1.029 *    0.956 *    20.984) +
         1.000 *    1.000 *     8.213) + =      28.855

Total of 2 main streams to confluence:
Flow rates before confluence point:
      21.984       9.213
Maximum flow rates at confluence using above data:
       28.958       28.855
Area of streams before confluence:
        5.808        2.250
Effective area values after confluence:
        8.058        7.800
```

Results of confluence:
Total flow rate = 28.958(CFS)
Time of concentration = 9.904 min.
Effective stream area after confluence = 8.058(Ac.)
Study area average Pervious fraction(Ap) = 0.387
Study area average soil loss rate(Fm) = 0.280(In/Hr)
Study area total = 8.06(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 37.000 to Point/Station 43.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____
Upstream point/station elevation = 1418.500(Ft.)
Downstream point/station elevation = 1418.400(Ft.)
Pipe length = 146.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 28.958(CFS)
Nearest computed pipe diameter = 45.00(In.)
Calculated individual pipe flow = 28.958(CFS)
Normal flow depth in pipe = 33.84(In.)
Flow top width inside pipe = 38.86(In.)
Critical Depth = 19.51(In.)
Pipe flow velocity = 3.25(Ft/s)
Travel time through pipe = 0.75 min.
Time of concentration (TC) = 10.65 min.
End of computations, Total Study Area = 8.19 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.386
Area averaged SCS curve number = 33.7

# *APPENDIX D*

# *STREET CAPACITY HYDRAULIC CALCULATIONS*

# Worksheet for STREET A SECTION

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

MIN. STREET FLOW CAPACITY AT FLATTEST STREET SLOPE

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00500 | ft/ft |
| Discharge | 29.00 | ft³/s |

100-YEAR PEAK FLOW FOR TRACT 20245

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 0.60 |
| 0+05 | 0.50 |
| 0+06 | 0.00 |
| 0+07 | 0.01 |
| 0+24 | 0.34 |
| 0+41 | 0.01 |
| 0+42 | 0.00 |
| 0+43 | 0.50 |
| 0+48 | 0.60 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 0.60) | (0+48, 0.60) | 0.014 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 0.43 | ft |
| Elevation Range | 0.00 to 0.60 ft | |
| Flow Area | 9.62 | ft² |
| Wetted Perimeter | 37.80 | ft |

# Worksheet for STREET A SECTION

## Results

| | | | |
|---|---|---|---|
| Hydraulic Radius | | 0.25 | ft |
| Top Width | | 37.63 | ft |
| Normal Depth | | 0.43 | ft |
| Critical Depth | | 0.44 | ft |
| Critical Slope | | 0.00448 | ft/ft |
| Velocity | | 3.02 | ft/s |
| Velocity Head | | 0.14 | ft |
| Specific Energy | | 0.57 | ft |
| Froude Number | | 1.05 | |
| Flow Type | Supercritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.43 | ft |
| Critical Depth | 0.44 | ft |
| Channel Slope | 0.00500 | ft/ft |
| Critical Slope | 0.00448 | ft/ft |

THE SCENARIO RUN FOR STREET A IS THAT ALL LOT GRATE INLETS FAIL AND RUNOFF DRAINS TO STREET TO STREET A.
THE CALCULATION SHOW THAT THE 100-YEAR STORM WILL POND 0.43' ABOVE THE GUTTER FLOW LINE. THE PROPERTY LINE IS APROXIMATELY 0.60' ABOVE THE GUTTER FLOW LINE, THUS, RUNOFF WILL NOT FLOW ONTO THE PROPOSED PADS.

Irregular Section Editor : STREET A SECTION

Section Geometry

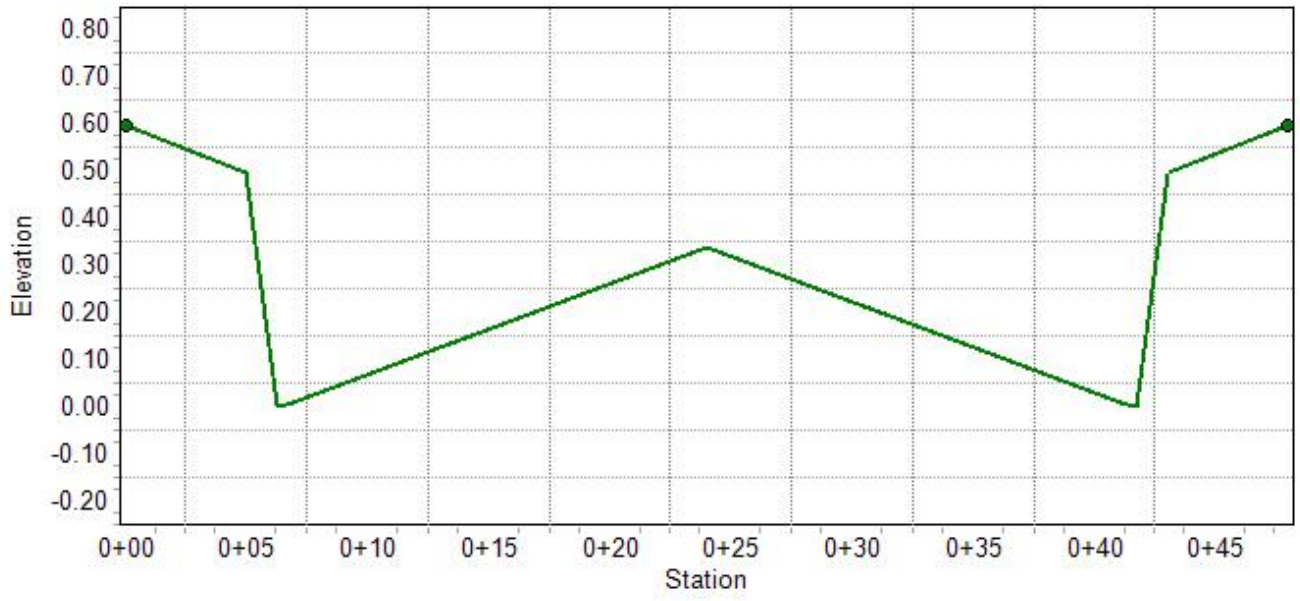
Insert | Delete

| | Station (ft) | Elevation (ft) |
|---|---|---|
| 1 | 0+00 | 0.60 |
| 2 | 0+05 | 0.50 |
| 3 | 0+06 | 0.00 |
| 4 | 0+07 | 0.01 |
| 5 | 0+24 | 0.34 |
| 6 | 0+41 | 0.01 |
| 7 | 0+42 | 0.00 |
| 8 | 0+43 | 0.50 |

Segment Roughness

Insert | Delete

| | Start Station & Elevation | End Station & Elevation | Roughness Coefficient |
|---|---|---|---|
| 1 | (0+00, 0.60) | (0+48, 0.60) | 0.014 |
| * | | | |




OK | Cancel | Help

# Worksheet for STREET B SECTION

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

MIN. STREET FLOW CAPACITY AT FLATTEST STREET SLOPE

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00500 | ft/ft |
| Discharge | 8.20 | ft³/s |

100-YEAR PEAK FLOW FOR STREET B

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 0.60 |
| 0+05 | 0.50 |
| 0+06 | 0.00 |
| 0+07 | 0.01 |
| 0+21 | 0.29 |
| 0+35 | 0.01 |
| 0+36 | 0.00 |
| 0+37 | 0.50 |
| 0+42 | 0.60 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 0.60) | (0+42, 0.60) | 0.014 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Normal Depth | 0.27 | ft |
| Elevation Range | 0.00 to 0.60 ft | |
| Flow Area | 4.08 | ft² |
| Wetted Perimeter | 29.46 | ft |

# Worksheet for STREET B SECTION

## Results

| | | | |
|---|---|---|---|
| Hydraulic Radius | | 0.14 | ft |
| Top Width | | 29.35 | ft |
| Normal Depth | | 0.27 | ft |
| Critical Depth | | 0.27 | ft |
| Critical Slope | | 0.00558 | ft/ft |
| Velocity | | 2.01 | ft/s |
| Velocity Head | | 0.06 | ft |
| Specific Energy | | 0.34 | ft |
| Froude Number | | 0.95 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.27 | ft |
| Critical Depth | 0.27 | ft |
| Channel Slope | 0.00500 | ft/ft |
| Critical Slope | 0.00558 | ft/ft |

THE SCENARIO RUN FOR STREET B IS THAT ALL LOT GRATE INLETS FAIL AND RUNOFF SHEET FLOWS ONTO STREET B.

THE CALCULATION SHOW THAT THE 100-YEAR STORM WILL POND 0.27 ABOVE THE GUTTER FLOW LINE. THE PROPERTY LINE IS APROXIMATELY 0.60' ABOVE THE GUTTER FLOW LINE, THUS, RUNOFF WILL NOT FLOW ONTO THE PROPOSED PADS.

Irregular Section Editor : STREET B SECTION

Section Geometry

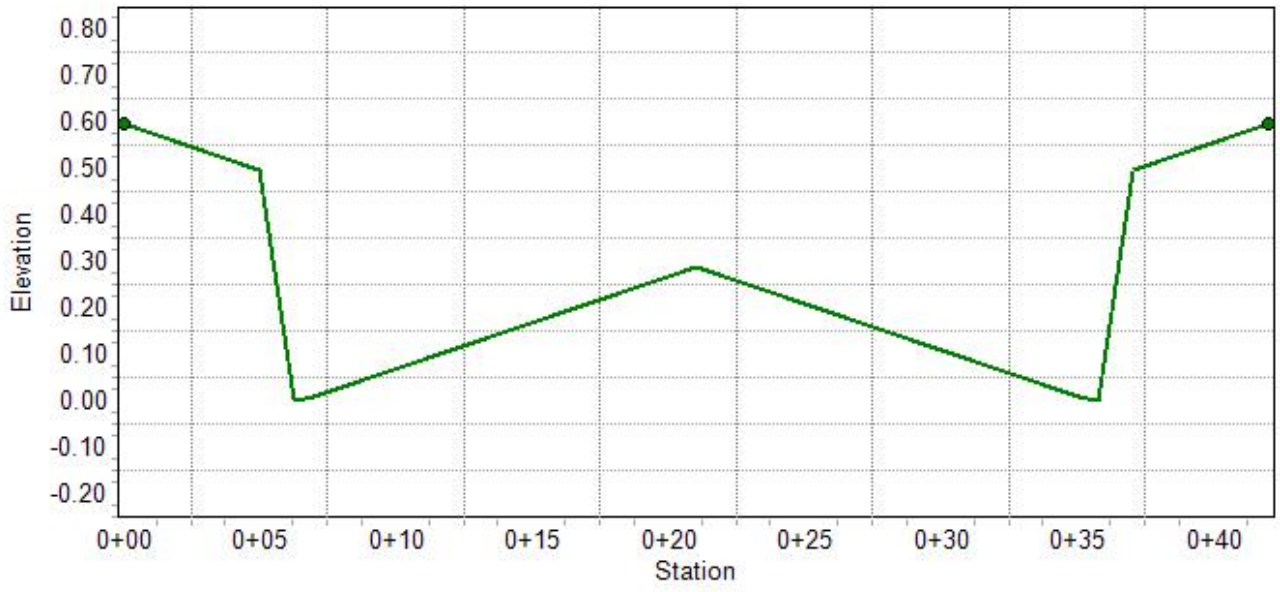
Insert | Delete

| | Station (ft) | Elevation (ft) |
|---|---|---|
| 1 | 0+00 | 0.60 |
| 2 | 0+05 | 0.50 |
| 3 | 0+06 | 0.00 |
| 4 | 0+07 | 0.01 |
| 5 | 0+21 | 0.29 |
| 6 | 0+35 | 0.01 |
| 7 | 0+36 | 0.00 |
| 8 | 0+37 | 0.50 |

Segment Roughness

Insert | Delete

| | Start Station & Elevation | End Station & Elevation | Roughness Coefficient |
|---|---|---|---|
| 1 | (0+00, 0.60) | (0+42, 0.60) | 0.014 |
| * | | | |




OK | Cancel | Help

# APPENDIX G2:

# PRELIMINARY WATER QUALITY MANAGEMENT PLAN

# Water Quality Management Plan

**For:**

## TRACT NO. 20245

**Prepared for:**

**Frontier Communities**

**2151 E. Convention Center Way, Suite 222**

**Ontario, CA 91764**

**909-354-8040**

**Prepared by:**

**Proactive Engineering Consultants, Inc.**

**200 South Main Street, Suite 300**

**Corona, CA 92882**

**(951) 280 3300**

**Submittal Date: 6/17/19**

**Revision Date: _____**

**Acceptance Date:_____**

# Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for Frontier Communities by Proactive Engineering Consultants, Inc.. The WQMP is intended to comply with the requirements of the City of Upland and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

.

| Project Data | | | |
|---|---|---|---|
| Permit/Application Number(s): | TBD | Grading Permit Number(s): | TBD |
| Tract/Parcel Map Number(s): | TRACT NO. 20245 | Building Permit Number(s): | TBD |
| CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract): | | | |

| Owner's Signature | | | |
|---|---|---|---|
| **Owner Name:** Frontier Communities | | | |
| Title | | | |
| Company | | | |
| Address | | | |
| Email | | | |
| Telephone # | | | |
| Signature | | Date | |

# Preparer's Certification

| Project Data | | | |
|---|---|---|---|
| Permit/Application Number(s): | TBD | Grading Permit Number(s): | TBD |
| Tract/Parcel Map Number(s): | TRACT NO. 20245 | Building Permit Number(s): | TBD |
| CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract): | | | |

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

| **Engineer:** Scott P. Gilbert | |
|---|---|
| Title | Senior Project Manager |
| Company | Proactive Engineering |
| Address | 200 South Main Street, Suite 300 |
| Email | ScottGilbert@proactiveengineering.net |
| Telephone # | 921 280 3300 |
| Signature |  |
| Date | 6/13/2019 |

PE Stamp Below



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RAINFALL DATA

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EXHIBIT B – DRAINAGE AREA CALCULATIONS

EXHIBIT C – DA SCHEMATIC

**APPENDIX C**

BMP DETAILS

BMP EDUCATIONAL MATERIAL

**APPENDIX D**

SOILS REPORT

# Section 1 Discretionary Permit(s)

| Form 1-1 Project Information | | | | | |
|---|---|---|---|---|---|
| Project Name | Tract No. 20245 | | | | |
| Project Owner Contact Name: | Frontier Communities | | | | |
| Mailing Address: | 2151 East Convention Center Way, Suite 222 Ontario CA 91764 | E-mail Address: | | Telephone: | |
| Permit/Application Number(s): | TBD | | Tract/Parcel Map Number(s): | Tract No. 20245 | |
| Additional Information/ Comments: | | | | | |
| Description of Project: | Tract No. 20245 will consist of 65 single family units. Tract No. 20245 will be constructed as a new medium residential development. Tract No. 20245 is approximately 9.2 acres. The proposed development will consist of single family detached units and a recreational park area. Tract No. 20245 is bounded by a landscape area to the north, existing residential development to the west and East 15 Street to the south and an existing detention basin to the east.<br><br>Tract No. 20245 in its current condition is situated on the westerly end of the 15th Street Basin. There is some vegetation within the 15th Street Basin. In the developed condition, the project will consist of three main drainage areas. Drainage Area No. 1 (DA 1) will route water quality flow rates to a proposed MWS Unit. Drainage Area No. (DA 2) will convey water quality runoff to a proposed storm drain network where it will be pretreated and infiltrated. Drainage Area No. 3 (DA 3) will route water quality flow rates to a proposed MWS Unit. All three drainage areas will outlet to a proposed 12' X 8 ' RCB storm drain. | | | | |

# Section 2 Project Description

## 2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

**Form 2.1-1 Description of Proposed Project**

**1** Development Category (Select all that apply):

| | | | |
|---|---|---|---|
| ☐ Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site | ☒ New development involving the creation of 10,000 ft² or more of impervious surface collectively over entire site | ☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539 | ☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft² or more |
| ☐ Hillside developments of 5,000 ft² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more | ☐ Developments of 2,500 ft² of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters. | ☐ Parking lots of 5,000 ft² or more exposed to storm water | ☐ Retail gasoline outlets that are either 5,000 ft² or more, or have a projected average daily traffic of 100 or more vehicles per day |

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

| | | | | | |
|---|---|---|---|---|---|
| **2** Project Area (ft2): | 400,750 | **3** Number of Dwelling Units: | 65 | **4** SIC Code: | 6552 Land Subdividers & Developers |

**5** Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

**6** Does Project include roads? Yes ☐ No ☒ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

# 2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

## Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

Residential Areas:
Stormwater facilities for this project will be maintained by either a CSA, LMD or Homeowners Association (HOA). If neither a CSA nor LMD is available, a HOA shall be established to maintain the proposed BMPs. The HOA would then be funded as directed by the Covenants, Conditions and Requirements (CC&R) to collect dues from the homeowners of the tract. The developer will be responsible for the maintenance until all homes are sold.

Non-Residential Areas:
Stormwater facilities for this project will be maintained by either a CSA or LMD. The developer will be responsible for the maintenance of the BMPs until accepted by CSA or LMD.

# 2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

| Form 2.3-1 Pollutants of Concern | | | |
|---|---|---|---|
| Pollutant | Please check: E=Expected, N=Not Expected | | Additional Information and Comments |
| Pathogens (Bacterial / Virus) | E ☒ | N ☐ | |
| Nutrients - Phosphorous | E ☒ | N ☐ | |
| Nutrients - Nitrogen | E ☒ | N ☐ | |
| Noxious Aquatic Plants | E ☒ | N ☐ | |
| Sediment | E ☒ | N ☐ | |
| Metals | E ☐ | N ☒ | |
| Oil and Grease | E ☒ | N ☐ | |
| Trash/Debris | E ☒ | N ☐ | |
| Pesticides / Herbicides | E ☒ | N ☐ | |
| Organic Compounds | E ☒ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |

# 2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

## Form 2.4-1 Water Quality Credits

**1** Project Types that Qualify for Water Quality Credits: *Select all that apply*

| | | | |
|---|---|---|---|
| ☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced] | Higher density development projects<br>☐ Vertical density [20%]<br>☒ 7 units/ acre [5%] | ☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%] | ☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%] |
| ☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%] | ☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%] | ☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%] | ☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%] |

**2** Total Credit % 5 *(Total all credit percentages up to a maximum allowable credit of 50 percent)*

| | |
|---|---|
| Description of Water Quality Credit Eligibility (if applicable) | Proposed development consist of aproximately 7 DU/ac.<br>Water Quality Credits will only be applied if total LID DCV cannot be met with on-site BMP's.<br>Use of water quality credits will be determined during final engineering. |

# Section 3 Site and Watershed Description

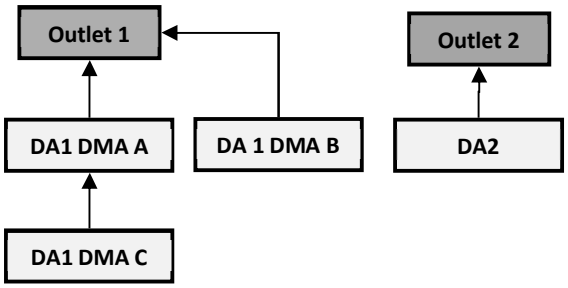
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

## Form 3-1 Site Location and Hydrologic Features

| Site coordinates *take GPS measurement at approximate center of site* | Latitude 34°07'06.32"N | Longitude 117°38'03.17"W | Thomas Bros Map page TBD |
|---|---|---|---|

**1** San Bernardino County climatic region: ☒ Valley ☐ Mountain

**2** Does the site have more than one drainage area (DA): Yes☒ No☐ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*




**Example only – modify for project specific WQMP using additional form**

| Conveyance | Briefly describe on-site drainage features to convey runoff that is not retained within a DMA |
|---|---|
| DA1 DMA C flows to DA1 DMA A | *Ex. Bioretention overflow to vegetated bioswale with 4' bottom width, 5:1 side slopes and bed slope of 0.01. Conveys runoff for 1000' through DMA 1 to existing catch basin on SE corner of property* |
| DA1 DMA A to Outlet 1 | Refer to DA schematic (EXHIBIT C). See Appendix B. |
| DA1 DMA B to Outlet 1 | |
| DA2 to Outlet 2 | |

## Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

| For Drainage Area 1's sub-watershed DMA, provide the following characteristics | DMA A | DMA B | DMA C | DMA D |
|---|---|---|---|---|
| **1** DMA drainage area ($ft^2$) | 10,751 | | | |
| **2** Existing site impervious area ($ft^2$) | 0 | | | |
| **3** Antecedent moisture condition *For desert areas, use* *http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf* | N/A | | | |
| **4** Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/* | A | | | |
| **5** Longest flowpath length (ft) | 149 | | | |
| **6** Longest flowpath slope (ft/ft) | 0.0221 | | | |
| **7** Current land cover type(s) *Select from Fig C-3 of Hydrology Manual* | Natural cover grass, annual or perennial | | | |
| **8** Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating* | Fair | | | |

# Form 3-2 Existing Hydrologic Characteristics (DA 2)

| For Drainage Area 2's sub-watershed DMA, provide the following characteristics | DMA A | DMA B | DMA C | DMA D |
|---|---|---|---|---|
| **1** DMA drainage area ($ft^2$) | 357,360 | | | |
| **2** Existing site impervious area ($ft^2$) | 0 | | | |
| **3** Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf* | Not applicable, project lies outside boundary map | | | |
| **4** Hydrologic soil group *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP* | A | | | |
| **5** Longest flowpath length (ft) | 1,550 | | | |
| **6** Longest flowpath slope (ft/ft) | 0.0009 | | | |
| **7** Current land cover type(s) *Select from Fig C-3 of Hydrology Manual* | Natural cover grass, annual or perennial | | | |
| **8** Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating* | Fair | | | |

# Form 3-2 Existing Hydrologic Characteristics (DA 3)

| For Drainage Area 3's sub-watershed DMA, provide the following characteristics | DMA A | DMA B | DMA C | DMA D |
|---|---|---|---|---|
| **1** DMA drainage area ($ft^2$) | 48,796 | | | |
| **2** Existing site impervious area ($ft^2$) | 0 | | | |
| **3** Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf* | Not applicable, project lies outside boundary map | | | |
| **4** Hydrologic soil group *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP* | A | | | |
| **5** Longest flowpath length (ft) | 519 | | | |
| **6** Longest flowpath slope (ft/ft) | 0.0202 | | | |
| **7** Current land cover type(s) *Select from Fig C-3 of Hydrology Manual* | Natural cover grass, annual or perennial | | | |
| **8** Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating* | Fair | | | |

## Form 3-3 Watershed Description for Drainage Area

| | |
|---|---|
| Receiving waters<br>*Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/ See 'Drainage Facilities" link at this website* | Santa Ana Reach 3 (Prado Basin)<br>Cucamonga Creek |
| Applicable TMDLs<br>*Refer to Local Implementation Plan* | TBD by City |
| 303(d) listed impairments<br>*Refer to Local Implementation Plan and Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml* | **Cucamonga:** Cadmium , Copper , Lead , Zinc, pH<br>**Santa Ana Reach 3**: Lead |
| Environmentally Sensitive Areas (ESA)<br>*Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/* | None |
| Unlined Downstream Water Bodies<br>*Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/* | Cucamonga Channel |
| Hydrologic Conditions of Concern | ☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal*<br>☒ No |
| Watershed–based BMP included in a RWQCB approved WAP | ☐ Yes *Attach verification of regional BMP evaluation criteria in WAP*<br>• *More Effective than On-site LID*<br>• *Remaining Capacity for Project DCV*<br>• *Upstream of any Water of the US*<br>• *Operational at Project Completion*<br>• *Long-Term Maintenance Plan*<br>☒ No |

# Section 4 Best Management Practices (BMP)

## 4.1 Source Control BMP

### 4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

## Form 4.1-1 Non-Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, if not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| N1 | Education of Property Owners, Tenants and Occupants on Stormwater BMPs | ☒ | ☐ | Residential BMP packets will be given to all first time homeowners as part of the disclosure exhibits distributed by home builder. BMP handouts are included in Appendix C. |
| N2 | Activity Restrictions | ☒ | ☐ | Home owners must prevent pollutant runoff. |
| N3 | Landscape Management BMPs | ☒ | ☐ | The HOA will maintain landscape areas. |
| N4 | BMP Maintenance | ☒ | ☐ | BMP'S will be maintained by the HOA. |
| N5 | Title 22 CCR Compliance (How development will comply) | ☐ | ☒ | Title 22 applies to communitiy care facilities regulated by the Community Care Licensing Division. |
| N6 | Local Water Quality Ordinances | ☐ | ☐ | TBD |
| N7 | Spill Contingency Plan | ☐ | ☒ | Residents are not typically required. |
| N8 | Underground Storage Tank Compliance | ☐ | ☒ | There will not be any subtances within the proposed project that will require to be contained in underground storage tanks. |
| N9 | Hazardous Materials Disclosure Compliance | ☐ | ☒ | No hazardous materials will be used/handled within the project limits. |

## Form 4.1-1 Non-Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, if not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| N10 | Uniform Fire Code Implementation | ☐ | ☒ | No hazardous materials will be used/handled within the project limits. |
| N11 | Litter/Debris Control Program | ☒ | ☐ | HOA will provide litter/debris control of common areas and streets. |
| N12 | Employee Training | ☒ | ☐ | A copy of this WQMP will be on file at the HOA office and board of members will be educated on it. This WQMP is one of their guidelines and should be reviewed alongside the CASQA Stormwater BMP Handbook for New Development and Redevelopment by personnel prior to performing BMP maintenance. Training should be both formal and informal, occur on an ongoing basis whe it is appropiate and convinient, and should include training/workshops offered by the SWRCB, RWQCB, or other locally recognized agencies or professional organzations. |
| N13 | Housekeeping of Loading Docks | ☐ | ☒ | There are no loading docks within the proposed project limits. |
| N14 | Catch Basin Inspection Program | ☒ | ☐ | HOA to maintain private SD catch basins. |
| N15 | Vacuum Sweeping of Private Streets and Parking Lots | ☒ | ☐ | HOA to maintain private private streets and parking lots. |
| N16 | Other Non-structural Measures for Public Agency Projects | ☐ | ☒ | Not Applicable |
| N17 | Comply with all other applicable NPDES permits | ☒ | ☐ | Compliance under California CGP obtained WDID. |

## Form 4.1-2 Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, If not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| S1 | Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13) | ☒ | ☐ | SD stenciling to be applied to private catch basins. |
| S2 | Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34) | ☐ | ☒ | No proposed outdoor material storage areas. |
| S3 | Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32) | ☐ | ☒ | Trash recepticals will be provided to residents. |
| S4 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12) | ☒ | ☐ | Homebuilder will provide compliance with CASQA BMP fact sheet SD-12. |
| S5 | Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement | ☒ | ☐ | TBD |
| S6 | Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10) | ☒ | ☐ | Grading within slope areas will be protected as indicated in CASQA BMP SD-10 |
| S7 | Covered dock areas (CASQA New Development BMP Handbook SD-31) | ☐ | ☒ | No proposed dock areas. |
| S8 | Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31) | ☐ | ☒ | No proposed maintenance bays |
| S9 | Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | No proposed vehicle wash areas |
| S10 | Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36) | ☐ | ☒ | No proposed outdoor processing areas |

## Form 4.1-2 Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, If not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| S11 | Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | Not applicable to residential projects |
| S12 | Fueling areas (CASQA New Development BMP Handbook SD-30) | ☐ | ☒ | Not applicable to residential projects |
| S13 | Hillside landscaping (CASQA New Development BMP Handbook SD-10) | ☐ | ☒ | Distirbued hillside areas will be landscaped as indicated in CASQA BMP SD-10 |
| S14 | Wash water control for food preparation areas | ☐ | ☒ | Not applicable to residential projects |
| S15 | Community car wash racks (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | No proposed vehicle wash areas |

### 4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

**Form 4.1-3 Preventative LID Site Design Practices Checklist**

| Site Design Practices<br>*If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets* |
|---|
| Minimize impervious areas: Yes ☒ No ☐<br>Explanation: The project will include landscape areas and open spaces to optimize pervious surfaces. |
| Maximize natural infiltration capacity: Yes ☒ No ☐<br>Explanation: Roof drains will drain to pervious areas where possible to maximize infiltration. |
| Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐<br>Explanation: The site will preserve existing drainage patterns. |
| Disconnect impervious areas: Yes ☒ No ☐<br>Explanation: Runoff from roof structures will outlet to splash blocks and onto landscape areas prior to entering the storm drain system. |
| Protect existing vegetation and sensitive areas: Yes ☐ No ☒<br>Explanation: There is no existing vegetation on site. |
| Re-vegetate disturbed areas: Yes ☐ No ☒<br>Explanation: Not Applicable |
| Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐<br>Explanation: Appropiate grading and construction activities will be utilized for this site. |
| Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒<br>Explanation: There are no opportunities to use vegetated drainage swales. |
| Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐<br>Explanation: Appropiate grading and construction activities will be utilized for this site. |

# 4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the $P_6$ method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 $mi^2$), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

## Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

| | | |
|---|---|---|
| **1** Project area DA 1 ($ft^2$): 10,751 | **2** Imperviousness after applying preventative site design practices (Imp%): 65 | **3** Runoff Coefficient (Rc): _0.45<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |
| **4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.63 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html* | | |
| **5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.93<br>*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)* | | |
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | | 24-hrs ☐<br>48-hrs ☒ |
| **7** Compute design capture volume, DCV ($ft^3$): 737<br>*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*<br>*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2* | | |

# Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 2)

| | | |
|---|---|---|
| **1** Project area DA 2 ($ft^2$): 357,360 | **2** Imperviousness after applying preventative site design practices (Imp%): 49 | **3** Runoff Coefficient (Rc): _0.33<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |

**4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.63 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

**5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.93

*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*

| | |
|---|---|
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | 24-hrs ☐<br>48-hrs ☒ |

**7** Compute design capture volume, DCV ($ft^3$): 18,155

*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*

# Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 3)

| | | |
|---|---|---|
| **1** Project area DA 2 ($ft^2$): 48,796 | **2** Imperviousness after applying preventative site design practices (Imp%): 57 | **3** Runoff Coefficient (Rc): _0.39<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |

**4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.63 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

**5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.93

*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*

| | |
|---|---|
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | 24-hrs ☐<br>48-hrs ☒ |

**7** Compute design capture volume, DCV ($ft^3$): 2,879

*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*

## Form 4.2-2 Summary of HCOC Assessment DA 1, DA 2, DA 3

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☐ No ☒

*Go to*: *http://permitrack.sbcounty.gov/wap/*

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

*(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)*

If "No," then proceed to Section 4.3 Project Conformance Analysis

| Condition | Runoff Volume ($ft^3$) | Time of Concentration (min) | Peak Runoff (cfs) |
|---|---|---|---|
| Pre-developed | **1** N/A<br>*Form 4.2-3 Item 12* | **2** N/A<br>*Form 4.2-4 Item 13* | **3** N/A<br>*Form 4.2-5 Item 10* |
| Post-developed | **4** N/A<br>*Form 4.2-3 Item 13* | **5** N/A<br>*Form 4.2-4 Item 14* | **6** N/A<br>*Form 4.2-5 Item 14* |
| Difference | **7** *N/A*<br>*Item 4 – Item 1* | **8** *N/A*<br>*Item 2 – Item 5* | **9** *N/A*<br>*Item 6 – Item 3* |
| Difference<br>(as % of pre-developed) | **10** *N/A%*<br>*Item 7 / Item 1* | **11** *N/A%*<br>*Item 8 / Item 2* | **12** *N/A%*<br>*Item 9 / Item 3* |

## Form 4.2-3 HCOC Assessment for Runoff Volume (DA 1)

| **Weighted Curve Number Determination for: Pre-developed DA** | DMA A | DMA B | DMA C | DMA D | DMA E | DMA F | DMA G | DMA H |
|---|---|---|---|---|---|---|---|---|
| **1a** Land Cover type | | | | | | | | |
| **2a** Hydrologic Soil Group (HSG) | | | | | | | | |
| **3a** DMA Area, $ft^2$ *sum of areas of DMA should equal area of DA* | | | | | | | | |
| **4a** Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP* | | | | | | | | |
| **Weighted Curve Number Determination for: Post-developed DA** | DMA A | DMA B | DMA C | DMA D | DMA E | DMA F | DMA G | DMA H |
| **1b** Land Cover type | | | | | | | | |
| **2b** Hydrologic Soil Group (HSG) | | | | | | | | |
| **3b** DMA Area, $ft^2$ *sum of areas of DMA should equal area of DA* | | | | | | | | |
| **4b** Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP* | | | | | | | | |

| | | |
|---|---|---|
| **5** Pre-Developed area-weighted CN: | **7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10* | **9** Initial abstraction, $I_a$ (in): *$I_a$ = 0.2 * Item 7* |
| **6** Post-Developed area-weighted CN: | **8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10* | **10** Initial abstraction, $I_a$ (in): *$I_a$ = 0.2 * Item 8* |

**11** Precipitation for 2 yr, 24 hr storm (in):
*Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

**12** Pre-developed Volume ($ft^3$):
*$V_{pre}$ =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

**13** Post-developed Volume ($ft^3$):
*$V_{pre}$ =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

**14** Volume Reduction needed to meet HCOC Requirement, ($ft^3$):
*$V_{HCOC}$ = (Item 13 * 0.95) – Item 12*

# Form 4.2-4 HCOC Assessment for Time of Concentration (DA 1)

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

| Variables | Pre-developed DA1 *Use additional forms if there are more than 4 DMA* | | | | Post-developed DA1 *Use additional forms if there are more than 4 DMA* | | | |
|---|---|---|---|---|---|---|---|---|
| | DMA A | DMA B | DMA C | DMA D | DMA A | DMA B | DMA C | DMA D |
| **1** Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition* | | | | | | | | |
| **2** Change in elevation (ft) | | | | | | | | |
| **3** Slope (ft/ft), $S_o$ = *Item 2 / Item 1* | | | | | | | | |
| **4** Land cover | | | | | | | | |
| **5** Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP* | | | | | | | | |
| **6** Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet* | | | | | | | | |
| **7** Cross-sectional area of channel ($ft^2$) | | | | | | | | |
| **8** Wetted perimeter of channel (ft) | | | | | | | | |
| **9** Manning's roughness of channel (n) | | | | | | | | |
| **10** Channel flow velocity (ft/sec) $V_{fps}$ = *(1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5* | | | | | | | | |
| **11** Travel time to outlet (min) $T_t$ = *Item 6 / (Item 10 * 60)* | | | | | | | | |
| **12** Total time of concentration (min) $T_c$ = *Item 5 + Item 11* | | | | | | | | |
| **13** Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA* | | | | | | | | |
| **14** Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA* | | | | | | | | |
| **15** Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ = *(Item 13 * 0.95) – Item 14* | | | | | | | | |

# Form 4.2-5 HCOC Assessment for Peak Runoff (DA 1)

Compute peak runoff for pre- and post-developed conditions

| Variables | | Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)* | | | Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)* | | |
|---|---|---|---|---|---|---|---|
| | | DMA A | DMA B | DMA C | DMA A | DMA B | DMA C |
| **1** Rainfall Intensity for storm duration equal to time of concentration<br>*$I_{peak}$ = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)* | | | | | | | |
| **2** Drainage Area of each DMA (Acres)<br>*For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **3** Ratio of pervious area to total area<br>*For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **4** Pervious area infiltration rate (in/hr)<br>*Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP* | | | | | | | |
| **5** Maximum loss rate (in/hr)<br>*$F_m$ = Item 3 * Item 4*<br>*Use area-weighted $F_m$ from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **6** Peak Flow from DMA (cfs)<br>*$Q_p$ =Item 2 * 0.9 * (Item 1 - Item 5)* | | | | | | | |
| **7** Time of concentration adjustment factor for other DMA to site discharge point<br>*Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)* | DMA A | *n/a* | | | *n/a* | | |
| | DMA B | | *n/a* | | | *n/a* | |
| | DMA C | | | *n/a* | | | *n/a* |

| | | |
|---|---|---|
| **8** Pre-developed $Q_p$ at $T_c$ for DMA A:<br>*$Q_p$ = Item $6_{DMAA}$ + [Item $6_{DMAB}$ * (Item $1_{DMAA}$ - Item $5_{DMAB}$)/(Item $1_{DMAB}$ - Item $5_{DMAB}$)* Item $7_{DMAA/2}$] + [Item $6_{DMAC}$ * (Item $1_{DMAA}$ - Item $5_{DMAC}$)/(Item $1_{DMAC}$ - Item $5_{DMAC}$)* Item $7_{DMAA/3}$]* | **9** Pre-developed $Q_p$ at $T_c$ for DMA B:<br>*$Q_p$ = Item $6_{DMAB}$ + [Item $6_{DMAA}$ * (Item $1_{DMAB}$ - Item $5_{DMAA}$)/(Item $1_{DMAA}$ - Item $5_{DMAA}$)* Item $7_{DMAB/1}$] + [Item $6_{DMAC}$ * (Item $1_{DMAB}$ - Item $5_{DMAC}$)/(Item $1_{DMAC}$ - Item $5_{DMAC}$)* Item $7_{DMAB/3}$]* | **10** Pre-developed $Q_p$ at $T_c$ for DMA C:<br>*$Q_p$ = Item $6_{DMAC}$ + [Item $6_{DMAA}$ * (Item $1_{DMAC}$ - Item $5_{DMAA}$)/(Item $1_{DMAA}$ - Item $5_{DMAA}$)* Item $7_{DMAC/1}$] + [Item $6_{DMAB}$ * (Item $1_{DMAC}$ - Item $5_{DMAB}$)/(Item $1_{DMAB}$ - Item $5_{DMAB}$)* Item $7_{DMAC/2}$]* |
| **10** Peak runoff from pre-developed condition confluence analysis (cfs): | *Maximum of Item 8, 9, and 10 (including additional forms as needed)* | |
| **11** Post-developed $Q_p$ at $T_c$ for DMA A:<br>*Same as Item 8 for post-developed values* | **12** Post-developed $Q_p$ at $T_c$ for DMA B:<br>*Same as Item 9 for post-developed values* | **13** Post-developed $Q_p$ at $T_c$ for DMA C:<br>*Same as Item 10 for post-developed values* |
| **14** Peak runoff from post-developed condition confluence analysis (cfs): | *Maximum of Item 11, 12, and 13 (including additional forms as needed)* | |
| **15** Peak runoff reduction needed to meet HCOC Requirement (cfs): | *$Q_{p\text{-}HCOC}$ = (Item 14 * 0.95) – Item 10* | |

# 4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

## Form 4.3-1 Infiltration BMP Feasibility (DA 1, DA 2 & DA 3)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
*Refer to Section 5.3.2.1 of the TGD for WQMP*

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
*See Section 3.5 of the TGD for WQMP and WAP*

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒
*If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.*

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☒
*If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.*
*If no, then proceed to Item 9, below.*

[9] All answers to Item 1 through Item 6 are "No":
*Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.*
*Proceed to Form 4.3-2, Hydrologic Source Control BMP.*

DA 1 & DA 3 WILL BE ADDRESSED WITH BIOFILTRATION BMP'S DUE TO LACK OF USABLE SPACE AND UTILITY CONFLICTS.

### 4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

**Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)**

| | | | |
|---|---|---|---|
| **1** Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6* | DA 1 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Total impervious area draining to pervious area ($ft^2$) | N/A | | |
| **3** Ratio of pervious area receiving runoff to impervious area | N/A | | |
| **4** Retention volume achieved from impervious area dispersion ($ft^3$) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff* | N/A | | |
| **5** Sum of retention volume achieved from impervious area dispersion ($ft^3$): N/A *$V_{retention}$ =Sum of Item 4 for all BMPs* | | | |
| **6** Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14* | DA 1 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **7** Ponding surface area ($ft^2$) | N/A | | |
| **8** Ponding depth (ft) | N/A | | |
| **9** Surface area of amended soil/gravel ($ft^2$) | N/A | | |
| **10** Average depth of amended soil/gravel (ft) | N/A | | |
| **11** Average porosity of amended soil/gravel | N/A | | |
| **12** Retention volume achieved from on-lot infiltration ($ft^3$) *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)* | N/A | | |
| **13** Runoff volume retention from on-lot infiltration ($ft^3$): N/A *$V_{retention}$ =Sum of Item 12 for all BMPs* | | | |

## Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)

| | | | |
|---|---|---|---|
| **14** Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21* | DA 1 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **15** Rooftop area planned for ET BMP ($ft^2$) | N/A | | |
| **16** Average wet season ET demand (in/day) *Use local values, typical ~ 0.1* | N/A | | |
| **17** Daily ET demand ($ft^3$/day) *Item 15 * (Item 16 / 12)* | N/A | | |
| **18** Drawdown time (hrs) *Copy Item 6 in Form 4.2-1* | N/A | | |
| **19** Retention Volume ($ft^3$) $V_{retention}$ *= Item 17 * (Item 18 / 24)* | N/A | | |
| **20** Runoff volume retention from evapotranspiration BMPs ($ft^3$): $V_{retention}$ *=Sum of Item 19 for all BMPs* | | | |
| **21** Implementation of Street Trees: Yes ☒ No ☐ *If yes, complete Items 22-25. If no, proceed to Item 26* | DA 1 DMA A BMP Type Trees | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **22** Number of Street Trees | TBD | | |
| **23** Average canopy cover over impervious area ($ft^2$) | TBD | | |
| **24** Runoff volume retention from street trees ($ft^3$) $V_{retention}$ *= Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches* | TBD | | |
| **25** Runoff volume retention from street tree BMPs ($ft^3$): TBD $V_{retention}$ *= Sum of Item 24 for all BMPs* | | | |
| **26** Implementation of residential rain barrel/cisterns: Yes☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30* | DA 1 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **27** Number of rain barrels/cisterns | N/A | | |
| **28** Runoff volume retention from rain barrels/cisterns ($ft^3$) $V_{retention}$ *= Item 27 * 3* | N/A | | |
| **29** Runoff volume retention from residential rain barrels/Cisterns (ft3): N/A $V_{retention}$ *=Sum of Item 28 for all BMPs* | | | |
| **30** Total Retention Volume from Site Design Hydrologic Source Control BMPs: TBD *Sum of Items 5, 13, 20, 25 and 29* | | | |

# Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 2)

| | | | |
|---|---|---|---|
| **1** Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6* | DA 2 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Total impervious area draining to pervious area ($ft^2$) | N/A | | |
| **3** Ratio of pervious area receiving runoff to impervious area | N/A | | |
| **4** Retention volume achieved from impervious area dispersion ($ft^3$) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff* | N/A | | |
| **5** Sum of retention volume achieved from impervious area dispersion ($ft^3$): N/A *$V_{retention}$ =Sum of Item 4 for all BMPs* | | | |
| **6** Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14* | DA 2 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **7** Ponding surface area ($ft^2$) | N/A | | |
| **8** Ponding depth (ft) | N/A | | |
| **9** Surface area of amended soil/gravel ($ft^2$) | N/A | | |
| **10** Average depth of amended soil/gravel (ft) | N/A | | |
| **11** Average porosity of amended soil/gravel | N/A | | |
| **12** Retention volume achieved from on-lot infiltration ($ft^3$) *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)* | N/A | | |
| **13** Runoff volume retention from on-lot infiltration ($ft^3$): N/A *$V_{retention}$ =Sum of Item 12 for all BMPs* | | | |

## Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 2)

| | | | |
|---|---|---|---|
| **14** Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒<br>*If yes, complete Items 15-20. If no, proceed to Item 21* | DA 2 DMA A<br>BMP Type N/A | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **15** Rooftop area planned for ET BMP ($ft^2$) | N/A | | |
| **16** Average wet season ET demand (in/day)<br>*Use local values, typical ~ 0.1* | N/A | | |
| **17** Daily ET demand ($ft^3$/day)<br>*Item 15 * (Item 16 / 12)* | N/A | | |
| **18** Drawdown time (hrs)<br>*Copy Item 6 in Form 4.2-1* | N/A | | |
| **19** Retention Volume ($ft^3$)<br>*$V_{retention}$ = Item 17 * (Item 18 / 24)* | N/A | | |
| **20** Runoff volume retention from evapotranspiration BMPs ($ft^3$): N/A *$V_{retention}$ =Sum of Item 19 for all BMPs* | | | |
| **21** Implementation of Street Trees: Yes ☒ No ☐<br>*If yes, complete Items 22-25. If no, proceed to Item 26* | DA 2 DMA A<br>BMP Type Trees | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **22** Number of Street Trees | TBD | | |
| **23** Average canopy cover over impervious area ($ft^2$) | TBD | | |
| **24** Runoff volume retention from street trees ($ft^3$)<br>*$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches* | TBD | | |
| **25** Runoff volume retention from street tree BMPs ($ft^3$): TBD *$V_{retention}$ = Sum of Item 24 for all BMPs* | | | |
| **26** Implementation of residential rain barrels/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30* | DA 2 DMA A<br>BMP Type N/A | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **27** Number of rain barrels/cisterns | N/A | | |
| **28** Runoff volume retention from rain barrels/cisterns ($ft^3$)<br>*$V_{retention}$ = Item 27 * 3* | N/A | | |
| **29** Runoff volume retention from residential rain barrels/Cisterns (ft3): N/A *$V_{retention}$ =Sum of Item 28 for all BMPs* | | | |
| **30** Total Retention Volume from Site Design Hydrologic Source Control BMPs: TBD *Sum of Items 5, 13, 20, 25 and 29* | | | |

# Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 3)

| | | | |
|---|---|---|---|
| **1** Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6* | DA 3 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Total impervious area draining to pervious area ($ft^2$) | N/A | | |
| **3** Ratio of pervious area receiving runoff to impervious area | N/A | | |
| **4** Retention volume achieved from impervious area dispersion ($ft^3$) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff* | N/A | | |
| **5** Sum of retention volume achieved from impervious area dispersion ($ft^3$): N/A *$V_{retention}$ =Sum of Item 4 for all BMPs* | | | |
| **6** Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14* | DA 3 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **7** Ponding surface area ($ft^2$) | N/A | | |
| **8** Ponding depth (ft) | N/A | | |
| **9** Surface area of amended soil/gravel ($ft^2$) | N/A | | |
| **10** Average depth of amended soil/gravel (ft) | N/A | | |
| **11** Average porosity of amended soil/gravel | N/A | | |
| **12** Retention volume achieved from on-lot infiltration ($ft^3$) *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)* | N/A | | |
| **13** Runoff volume retention from on-lot infiltration ($ft^3$): N/A *$V_{retention}$ =Sum of Item 12 for all BMPs* | | | |

## Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 3)

| | | | |
|---|---|---|---|
| **14** Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒<br>*If yes, complete Items 15-20. If no, proceed to Item 21* | DA 3 DMA A<br>BMP Type N/A | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **15** Rooftop area planned for ET BMP ($ft^2$) | N/A | | |
| **16** Average wet season ET demand (in/day)<br>*Use local values, typical ~ 0.1* | N.A | | |
| **17** Daily ET demand ($ft^3$/day)<br>*Item 15 * (Item 16 / 12)* | N/A | | |
| **18** Drawdown time (hrs)<br>*Copy Item 6 in Form 4.2-1* | N/A | | |
| **19** Retention Volume ($ft^3$)<br>*$V_{retention}$ = Item 17 * (Item 18 / 24)* | N/A | | |
| **20** Runoff volume retention from evapotranspiration BMPs ($ft^3$): N/A *$V_{retention}$ =Sum of Item 19 for all BMPs* | | | |
| **21** Implementation of Street Trees: Yes ☒ No ☐<br>*If yes, complete Items 22-25. If no, proceed to Item 26* | DA 3 DMA A<br>BMP Type Trees | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **22** Number of Street Trees | TBD | | |
| **23** Average canopy cover over impervious area ($ft^2$) | TBD | | |
| **24** Runoff volume retention from street trees ($ft^3$)<br>*$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches* | TBD | | |
| **25** Runoff volume retention from street tree BMPs ($ft^3$): TBD *$V_{retention}$ = Sum of Item 24 for all BMPs* | | | |
| **26** Implementation of residential rain barrels/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30* | DA 3 DMA A<br>BMP Type N/A | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **27** Number of rain barrels/cisterns | N/A | | |
| **28** Runoff volume retention from rain barrels/cisterns ($ft^3$)<br>*$V_{retention}$ = Item 27 * 3* | N/A | | |
| **29** Runoff volume retention from residential rain barrels/Cisterns (ft3): N/A *$V_{retention}$ =Sum of Item 28 for all BMPs* | | | |
| **30** Total Retention Volume from Site Design Hydrologic Source Control BMPs: TBD *Sum of Items 5, 13, 20, 25 and 29* | | | |

### 4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

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## Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

**1** Remaining LID DCV not met by site design HSC BMP (ft³): 737 *$V_{unmet}$ = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

| BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs* | DA 1 DMA A BMP Type N/A | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **2** Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods* | N/A | | |
| **3** Infiltration safety factor *See TGD Section 5.4.2 and Appendix D* | N/A | | |
| **4** Design percolation rate (in/hr) *$P_{design}$ = Item 2 / Item 3* | N/A | | |
| **5** Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1* | N/A | | |
| **6** Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details* | N/A | | |
| **7** Ponding Depth (ft) *$d_{BMP}$ = Minimum of (1/12*Item 4*Item 5) or Item 6* | N/A | | |
| **8** Infiltrating surface area, $SA_{BMP}$ (ft²) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP* | N/A | | |
| **9** Amended soil depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details* | N/A | | |
| **10** Amended soil porosity | N/A | | |
| **11** Gravel depth, $d_{media}$ (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details* | N/A | | |
| **12** Gravel porosity | N/A | | |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | N/A | | |
| **14** Above Ground Retention Volume (ft³) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | N/A | | |
| **15** Underground Retention Volume (ft³) *Volume determined using manufacturer's specifications and calculations* | N/A | | |

**16** Total Retention Volume from LID Infiltration BMPs: 0 *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*

**17** Fraction of DCV achieved with infiltration BMP: 0% *Retention% = Item 16 / Form 4.2-1 Item 7*

**18** Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☒

*If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*

SEE CALCULATIONS ON NEXT PAGE FOR BASIN SIZING AND DRAWDOWN TIME.

**DRAINAGE AREA 2 BASIN**
**TABLE I**
**BMP INFILTRATION TIME**
**DESIGN CALCULATIONS**

| INFILTRATION BASIN AREA (SQ-FT) | PROVIDED V(BMP) (CU-FT) | REQUIRED V(BMP) (CU-FT) | INFILTRATION RATE SAFETY FACTOR | INFILTRATION RATE (IN/HR) | INFILTRATION RATE - SAFETY FACTOR APPLIED (IN/HR) | PERCOLATION TIME (HR) |
|---|---|---|---|---|---|---|
| 2,829 | 18,217 | 18,155 | 2 | 8.71 | 4.36 | 18 |

**NOTES:**

PERCOLATION TIME = REQUIRED VBMP ÷ (UNDERGROUND INFILTRATION AREA X INFILTRATION RATE)

PROJECT GOAL IS ACHIEVED SINCE THE PROVIDED $V_{BMP,}$ IS GREATER THAN THE REQUIRED $V_{BMP}$ AND PERCOLATION TIME IS LESS THAN THE ALLOWED MAXIMUM 48-HR DRAWDOWN TIME.

# DYODS™
## Design Your Own Detention System

CONTECH CMP DETENTION SYSTEMS

CONTECH STORMWATER SOLUTIONS INC.

For design assistance, drawings,
and pricing send completed worksheet to:
**dyods@contech-cpi.com**




## Project Summary

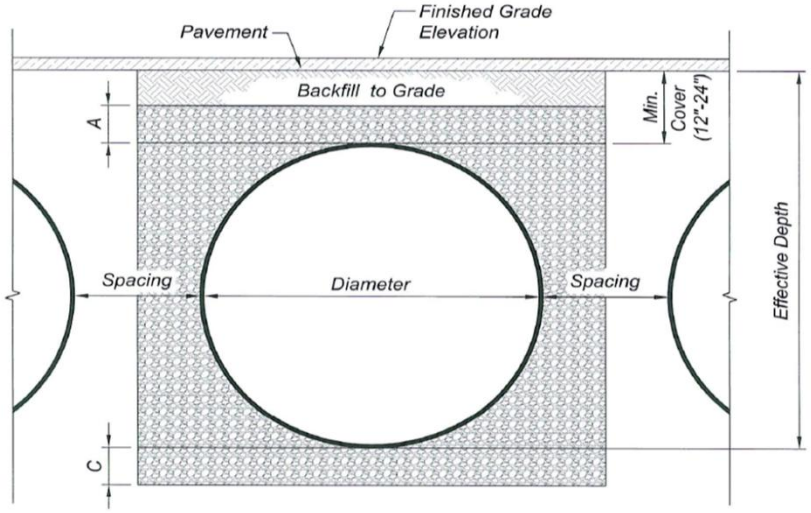
| | |
|---|---|
| Date: | 9/20/2018 |
| Project Name: | UPLAND PROJECT |
| City / County: | Upland - SB County |
| State: | CA |
| Designed By: | Proactive Engineering |
| Company: | Proactive Engineering |
| Telephone: | 951-280-3300 |

**Enter Information in Blue Cells**

## Corrugated Metal Pipe Calculator

| | |
|---|---|
| Storage Volume Required (cf): | 17,600 |
| Limiting Width (ft): | 23.00 |
| Invert Depth Below Asphalt (ft): | 9.00 |
| Solid or Perforated Pipe: | Perforated |
| Shape Or Diameter (in): | 72 |
| Number Of Headers: | 2 |
| Spacing between Barrels (ft): | 4.00 |
| Stone Width Around Perimeter of System (ft): | 3.5 |
| Depth A: Porous Stone Above Pipe (in): | 30 |
| Depth C: Porous Stone Below Pipe (in): | 48 |
| Stone Porosity (0 to 40%): | 40 |

28.27 $ft^2$ Pipe Area




## System Sizing

| | | | |
|---|---|---|---|
| Pipe Storage: | 6,786 | cf | |
| Porous Stone Storage: | 11,431 | cf | |
| Total Storage Provided: | 18,217 | cf | 103.5% Of Required Storage |
| Number of Barrels: | 2 | barrels | |
| Length per Barrel: | 104.0 | ft | |
| Length Per Header: | 16.0 | ft | |
| Rectangular Footprint (W x L): | 23. ft x 123. ft | | |

## CONTECH Materials

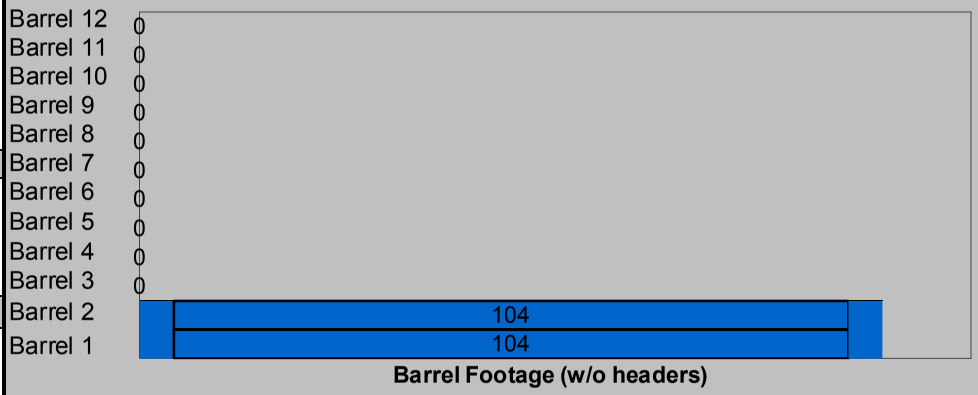
| | | |
|---|---|---|
| Total CMP Footage: | 240 | ft |
| Approximate Total Pieces: | 12 | pcs |
| Approximate Coupling Bands: | 12 | bands |
| Approximate Truckloads: | 6 | trucks |

## Construction Quantities**

| | | |
|---|---|---|
| Total Excavation: | 943 | cy |
| Porous Stone Backfill For Storage: | 1058 | cy stone |
| Backfill to Grade Excluding Stone: | -367 | cy fill |

***Construction quantities are approximate and should be verified upon final design*

## System Layout

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### 4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

**Form 4.3-4 Harvest and Use BMPs (DA 1, DA 2 & DA 3)**

**1** Remaining LID DCV not met by site design HSC or infiltration BMP ($ft^3$): N/A

*$V_{unmet}$ = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16*

| BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs* | DA N/A DMA N/A BMP Type N/A | DA N/A DMA N/A BMP Type N/A | DA N/A DMA N/A BMP Type N/A *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **2** Describe cistern or runoff detention facility | N/A | N/A | N/A |
| **3** Storage volume for proposed detention type ($ft^3$) *Volume of cistern* | N/A | N/A | N/A |
| **4** Landscaped area planned for use of harvested stormwater ($ft^2$) | N/A | N/A | N/A |
| **5** Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day | N/A | N/A | N/A |
| **6** Daily water demand ($ft^3$/day) *Item 4 * (Item 5 / 12)* | N/A | N/A | N/A |
| **7** Drawdown time (hrs) *Copy Item 6 from Form 4.2-1* | N/A | N/A | N/A |
| **8** Retention Volume ($ft^3$) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))* | N/A | N/A | N/A |

**9** Total Retention Volume ($ft^3$) from Harvest and Use BMPN/A *Sum of Item 8 for all harvest and use BMP included in plan*

**10** Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☒

*If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.*

## 4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

### Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA 1)

| | | |
|---|---|---|
| **1** Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment ($ft^3$): 737 *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9* | List pollutants of concern *Copy from Form 2.3-1.* Pathogens (Bacterial / Virus), Phosphorous, Nitrogen, Sediment, Metals, Oil and Grease, Trash/Debris, Pesticides / Herbicides, Organic Compounds and Oxygen Demanding | |
| **2** Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)* | Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume* | Flow-based biotreatment *Use Form 4.3-8 to compute treated volume* |
| | ☐ Bioretention with underdrain<br>☐ Planter box with underdrain<br>☐ Constructed wetlands<br>☐ Wet extended detention<br>☐ Dry extended detention | ☐ Vegetated swale<br>☐ Vegetated filter strip<br>☒ Proprietary biotreatment |
| **3** Volume biotreated in volume based biotreatment BMP ($ft^3$): N/A *Form 4.3-6 Item 15 + Form 4.3-7 Item 13* | **4** Compute remaining LID DCV with implementation of volume based biotreatment BMP ($ft^3$): 737 *Item 1 – Item 3* | **5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: 100% *Item 4 / Item 1* |
| **6** Flow-based biotreatment BMP capacity provided (cfs): 0.05 *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)* | | |
| **7** Metrics for MEP determination:<br>• Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☒ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.* | | |

# Form 4.3-6 Volume Based Biotreatment (DA N/A) – Bioretention and Planter Boxes with Underdrains

| Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)* | DA 0 DMA N/A BMP Type N/A | DA 0 DMA N/A BMP Type N/A | DA 0 DMA N/A BMP Type N/A *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **1** Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP* | N/A | N/A | N/A |
| **2** Amended soil infiltration rate *Typical ~ 5.0* | N/A | N/A | N/A |
| **3** Amended soil infiltration safety factor *Typical ~ 2.0* | N/A | N/A | N/A |
| **4** Amended soil design percolation rate (in/hr) $P_{design}$ *= Item 2 / Item 3* | N/A | N/A | N/A |
| **5** Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1* | N/A | N/A | N/A |
| **6** Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **7** Ponding Depth (ft) $d_{BMP}$ *= Minimum of (1/12 * Item 4 * Item 5) or Item 6* | N/A | N/A | N/A |
| **8** Amended soil surface area ($ft^2$) | N/A | N/A | N/A |
| **9** Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **10** Amended soil porosity, *n* | N/A | N/A | N/A |
| **11** Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **12** Gravel porosity, *n* | N/A | N/A | N/A |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | N/A | N/A | N/A |
| **14** Biotreated Volume ($ft^3$) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | N/A | N/A | N/A |
| **15** Total biotreated volume from bioretention and/or planter box with underdrains BMP: N/A *Sum of Item 14 for all volume-based BMPs included in this form* | | | |

# Form 4.3-7 Volume Based Biotreatment (DA N/A) – Constructed Wetlands and Extended Detention

| Biotreatment BMP Type<br>*Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.* | DA N/A DMA N/A<br>BMP Type N/A | | DA N/A DMA N/A<br>BMP Type N/A<br>*(Use additional forms for more BMPs)* | |
|---|---|---|---|---|
| | Forebay | Basin | Forebay | Basin |
| **1** Pollutants addressed with BMP forebay and basin<br>*List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP* | N/A | N/A | N/A | N/A |
| **2** Bottom width (ft) | N/A | N/A | N/A | N/A |
| **3** Bottom length (ft) | N/A | N/A | N/A | N/A |
| **4** Bottom area ($ft^2$) $A_{bottom}$ = *Item 2 * Item 3* | N/A | N/A | N/A | N/A |
| **5** Side slope (ft/ft) | N/A | N/A | N/A | N/A |
| **6** Depth of storage (ft) | N/A | N/A | N/A | N/A |
| **7** Water surface area ($ft^2$)<br>$A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))* | N/A | N/A | N/A | N/A |
| **8** Storage volume ($ft^3$) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details*<br>V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]* | N/A | N/A | N/A | N/A |
| **9** Drawdown Time (hrs) *Copy Item 6 from Form 2.1* | N/A | | N/A | |
| **10** Outflow rate (cfs) $Q_{BMP}$ = *(Item $8_{forebay}$ + Item $8_{basin}$) / (Item 9 * 3600)* | N/A | | N/A | |
| **11** Duration of design storm event (hrs) | N/A | | N/A | |
| **12** Biotreated Volume ($ft^3$)<br>$V_{biotreated}$ = *(Item $8_{forebay}$ + Item $8_{basin}$) +( Item 10 * Item 11 * 3600)* | N/A | | N/A | |
| **13** Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : N/A<br>*(Sum of Item 12 for all BMP included in plan)* | | | | |

## Form 4.3-8 Flow Based Biotreatment (DA N/A)

| Biotreatment BMP Type<br>*Vegetated swale, vegetated filter strip, or other comparable proprietary BMP* | DA N/A DMA N/A BMP Type N/A | DA N/A DMA N/A BMP Type N/A | DA N/A DMA N/A BMP Type N/A<br>*(Use additional forms for more BMPs)* |
|---|---|---|---|
| **1** Pollutants addressed with BMP<br>*List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5* | N/A | N/A | N/A |
| **2** Flow depth for water quality treatment (ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **3** Bed slope (ft/ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **4** Manning's roughness coefficient | N/A | N/A | N/A |
| **5** Bottom width (ft)<br>$b_w$ = *(Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)* | N/A | N/A | N/A |
| **6** Side Slope (ft/ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **7** Cross sectional area ($ft^2$)<br>*A = (Item 5 * Item 2) + (Item 6 * Item 2^2)* | N/A | N/A | N/A |
| **8** Water quality flow velocity (ft/sec)<br>*V = Form 4.3-5 Item 6 / Item 7* | N/A | N/A | N/A |
| **9** Hydraulic residence time (min)<br>*Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | N/A | N/A | N/A |
| **10** Length of flow based BMP (ft)<br>*L = Item 8 * Item 9 * 60* | N/A | N/A | N/A |
| **11** Water surface area at water quality flow depth ($ft^2$)<br>$SA_{top}$ = *(Item 5 + (2 * Item 2 * Item 6)) * Item 10* | N/A | N/A | N/A |

SIZING CALCULATIONS FOR MODULAR WETLAND UNITS IN DRAINAGE AREAS 1 AND 2 ARE BASED ON FIGURE 5-2 NOMOGRAPH FROM THE SAN BERNARDINO TECHNICAL GUIDE DOCUMENT.

SEE CALCULATIONS ON NEXT PAGE.

DA 1 - MWS UNIT NO. 1

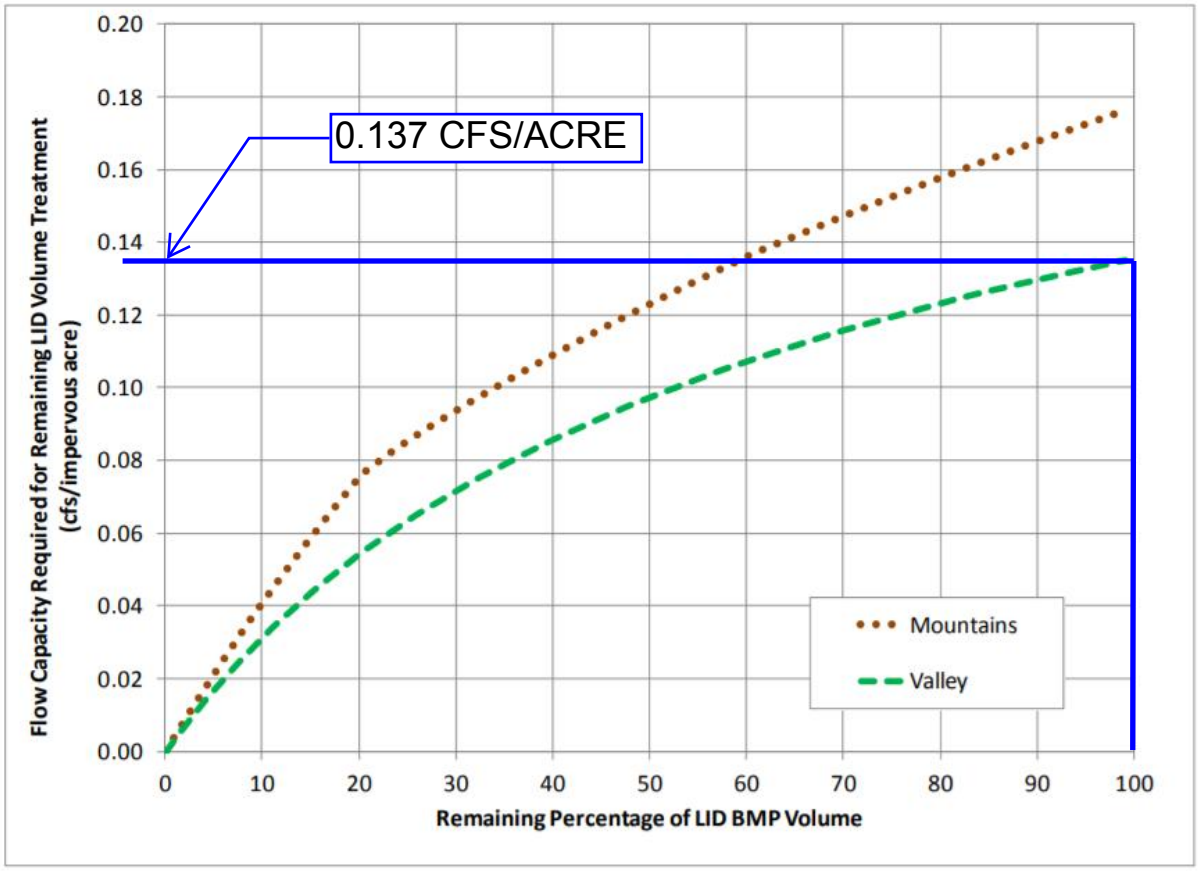


**Figure 5-2. Nomograph for Determining Flow-based BMP Capacity Requirement to meet Remaining Unmet DCV**

IMPERVIOUS AREAS IN DA 1 = 7,034 SF (0.16 ACRES)

FLOW CAPACITY REQ. =(0.137CFS/ACRE IMP. X 0.16 ACRES)

FLOW CAPACITY REQ. = 0.02 CFS

THUS, USE MWS L-4-4 WITH A TREATMENT CAPACITY OF 0.05 CFS

DA 3 - MWS UNIT NO. 2

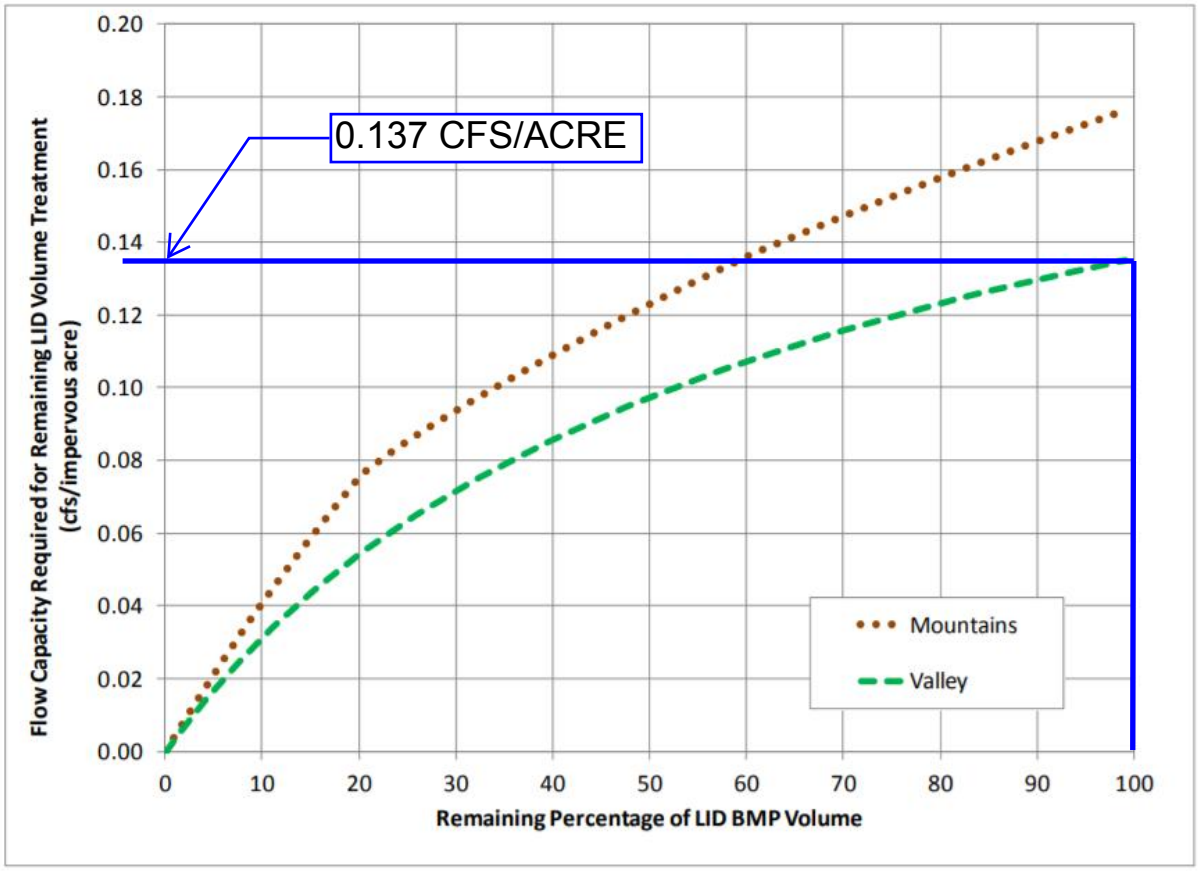


**Figure 5-2. Nomograph for Determining Flow-based BMP Capacity Requirement to meet Remaining Unmet DCV**

IMPERVIOUS AREAS IN DA 3 = 27,794 SF (0.64 ACRES)

FLOW CAPACITY REQ. =(0.137CFS/ACRE IMP. X 0.64 ACRES)

FLOW CAPACITY REQ. = 0.09 CFS

THUS, USE MWS L-4-8 WITH A TREATMENT CAPACITY OF 0.11 CFS

# MWS Linear | *Sizing Options*



## Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

| Model # | Dimensions | WetlandMEDIA Surface Area | Treatment Flow Rate (cfs) | |
|---|---|---|---|---|
| MWS-L-4-4 | 4′ x 4′ | 23 sq. ft. | 0.052 | USED, MWS NO. 1 |
| MWS-L-4-6 | 4′ x 6′ | 32 sq. ft. | 0.073 | |
| MWS-L-4-8 | 4′ x 8′ | 50 sq. ft. | 0.115 | USED, MWS NO. 2 |

| | | | |
|---|---|---|---|
| MWS-L-4-13 | 4′ x 13′ | 63 sq. ft. | 0.144 |
| MWS-L-4-15 | 4′ x 15′ | 76 sq. ft. | 0.175 |
| MWS-L-4-17 | 4′ x 17′ | 90 sq. ft. | 0.206 |
| MWS-L-4-19 | 4′ x 19′ | 103 sq. ft. | 0.237 |
| MWS-L-4-21 | 4′ x 21′ | 117 sq. ft. | 0.268 |
| MWS-L-6-8 | 7′ x 9′ | 64 sq. ft. | 0.147 |
| MWS-L-8-8 | 8′ x 8′ | 100 sq. ft. | 0.230 |
| MWS-L-8-12 | 8′ x 12′ | 151 sq. ft. | 0.346 |
| MWS-L-8-16 | 8′ x 16′ | 201 sq. ft. | 0.462 |
| MWS-L-8-20 | 9′ x 21′ | 252 sq. ft. | 0.577 |
| MWS-L-8-24 | 9′ x 25′ | 302 sq. ft. | 0.693 |



# Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.

| Model # | Treatment Capacity (cu. ft.) @ 24-Hour Drain Down | Treatment Capacity (cu. ft.) @ 48-Hour Drain Down |
|---|---|---|
| MWS-L-4-4 | 1140 | 2280 |
| MWS-L-4-6 | 1600 | 3200 |
| MWS-L-4-8 | 2518 | 5036 |
| MWS-L-4-13 | 3131 | 6261 |

| | | |
|---|---|---|
| MWS-L-4-15 | 3811 | 7623 |
| MWS-L-4-17 | 4492 | 8984 |
| MWS-L-4-19 | 5172 | 10345 |
| MWS-L-4-21 | 5853 | 11706 |
| MWS-L-6-8 | 3191 | 6382 |
| MWS-L-8-8 | 5036 | 10072 |
| MWS-L-8-12 | 7554 | 15109 |
| MWS-L-8-16 | 10073 | 20145 |
| MWS-L-8-20 | 12560 | 25120 |
| MWS-L-8-24 | 15108 | 30216 |

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Phone: (855) 566-3938

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## 4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

### Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

**1** Total LID DCV for the Project DA-1 ($ft^3$): 737 *Copy Item 7 in Form 4.2-1*

**2** On-site retention with site design hydrologic source control LID BMP ($ft^3$): TBD *Copy Item 30 in Form 4.3-2*

**3** On-site retention with LID infiltration BMP ($ft^3$): 0 *Copy Item 16 in Form 4.3-3*

**4** On-site retention with LID harvest and use BMP ($ft^3$): N/A *Copy Item 9 in Form 4.3-4*

**5** On-site biotreatment with volume based biotreatment BMP ($ft^3$): N/A *Copy Item 3 in Form 4.3-5*

**6** Flow capacity provided by flow based biotreatment BMP (cfs): 0.05 *Copy Item 6 in Form 4.3-5*

**7** LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  *If yes, sum of Items 2, 3, and 4 is greater than Item 1*
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  *If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized*
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☒ No ☐
  *If yes, Form 4.3-1 Items 7 and 8 were both checked yes*

**8** If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance,* $V_{alt}$ *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  *Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed*

# Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 2)

**1** Total LID DCV for the Project DA 2 ($ft^3$): 18,155 *Copy Item 7 in Form 4.2-1*

**2** On-site retention with site design hydrologic source control LID BMP ($ft^3$): N/A *Copy Item 30 in Form 4.3-2*

**3** On-site retention with LID infiltration BMP ($ft^3$): 18,217 *Copy Item 16 in Form 4.3-3*

**4** On-site retention with LID harvest and use BMP ($ft^3$): N/A *Copy Item 9 in Form 4.3-4*

**5** On-site biotreatment with volume based biotreatment BMP ($ft^3$): N/A *Copy Item 3 in Form 4.3-5*

**6** Flow capacity provided by flow based biotreatment BMP (cfs): N/A *Copy Item 6 in Form 4.3-5*

**7** LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☒ No ☐
  *If yes, sum of Items 2, 3, and 4 is greater than Item 1*
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  *If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized*
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  *If yes, Form 4.3-1 Items 7 and 8 were both checked yes*

**8** If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance,* $V_{alt}$ *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  *Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed*

# Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 3)

**1** Total LID DCV for the Project DA 3 ($ft^3$): 2,879 *Copy Item 7 in Form 4.2-1*

**2** On-site retention with site design hydrologic source control LID BMP ($ft^3$): TBD *Copy Item 30 in Form 4.3-2*

**3** On-site retention with LID infiltration BMP ($ft^3$): 0 *Copy Item 16 in Form 4.3-3*

**4** On-site retention with LID harvest and use BMP ($ft^3$): N/A *Copy Item 9 in Form 4.3-4*

**5** On-site biotreatment with volume based biotreatment BMP ($ft^3$): N/A *Copy Item 3 in Form 4.3-5*

**6** Flow capacity provided by flow based biotreatment BMP (cfs): 0.11 *Copy Item 6 in Form 4.3-5*

**7** LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  *If yes, sum of Items 2, 3, and 4 is greater than Item 1*
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  *If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized*
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☒ No ☐
  *If yes, Form 4.3-1 Items 7 and 8 were both checked yes*

**8** If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance,* $V_{alt}$ *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  *Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed*

## 4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

### Form 4.3-10 Hydromodification Control BMPs (DA 1)

| | |
|---|---|
| **1** Volume reduction needed for HCOC performance criteria ($ft^3$): N/A *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1* | **2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP ($ft^3$): N/A *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction* |
| **3** Remaining volume for HCOC volume capture ($ft^3$): N/A *Item 1 – Item 2* | **4** Volume capture provided by incorporating additional on-site or off-site retention BMPs ($ft^3$): N/A *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)* |

**5** If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

**6** Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☐

*If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:*

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
  *BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)*
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

**7** Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☐

*If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:*

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☐
  *BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)*
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

# 4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

# Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

**Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)**

| BMP | Reponsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
|---|---|---|---|
| MWS NO. 1 | FRONTIER COMMUNITIES | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. |
| MWS NO. 2 | FRONTIER COMMUNITIES | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. |
| CDS UNIT | FRONTIER COMMUNITIES | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. |
| UNDERGROUND INFILTRATION BASIN | FRONTIER COMMUNITIES | SCHEDULE SEMIANNUAL INSPECTION FOR THE BEGINNING AND END OF THE WET SEASON FOR STANDING WATER, SLOPE STABILITY, SEDIMENT ACCUMULATION, TRASH AND DEBRIS.<br><br>REMOVE ACCUMULATED TRASH AND DEBRIS IN THE BASIN DURING THE SEMIANNUAL INSPECTIONS.<br><br>SEE ADDITIONAL MAINTANANCE GUIDELINES IN ATTACHED BMP SHEET IN APPENDIX C. | SEMIANNUAL |

| | | | |
|---|---|---|---|
| CATCH BASINS ANTI-DUMPING SIGNAGE | FRONTIER COMMUNITIES | See attached BMP sheet for details in Appendix C. | SEE ATTACHED BMP SHEET FOR DETAILS IN APPENDIX C. |
| | | | |
| | | | |
| | | | |

# Section 6 WQMP Attachments

## 6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

## 6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

## 6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

## 6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreements

# *APPENDIX A*

# *RAINFALL DATA*

General Information
Homepage
Progress Reports
FAQ
Glossary

Precipitation Frequency
Data Server
GIS Grids
Maps
Time Series
Temporals
Documents

Probable Maximum Precipitation
Documents

Miscellaneous
Publications
Storm Analysis
Record Precipitation

Contact Us
Inquiries

# NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

## Data description

**Data type:** Precipitation depth ▼ **Units:** English ▼ **Time series type:** Partial duration ▼

## Select location

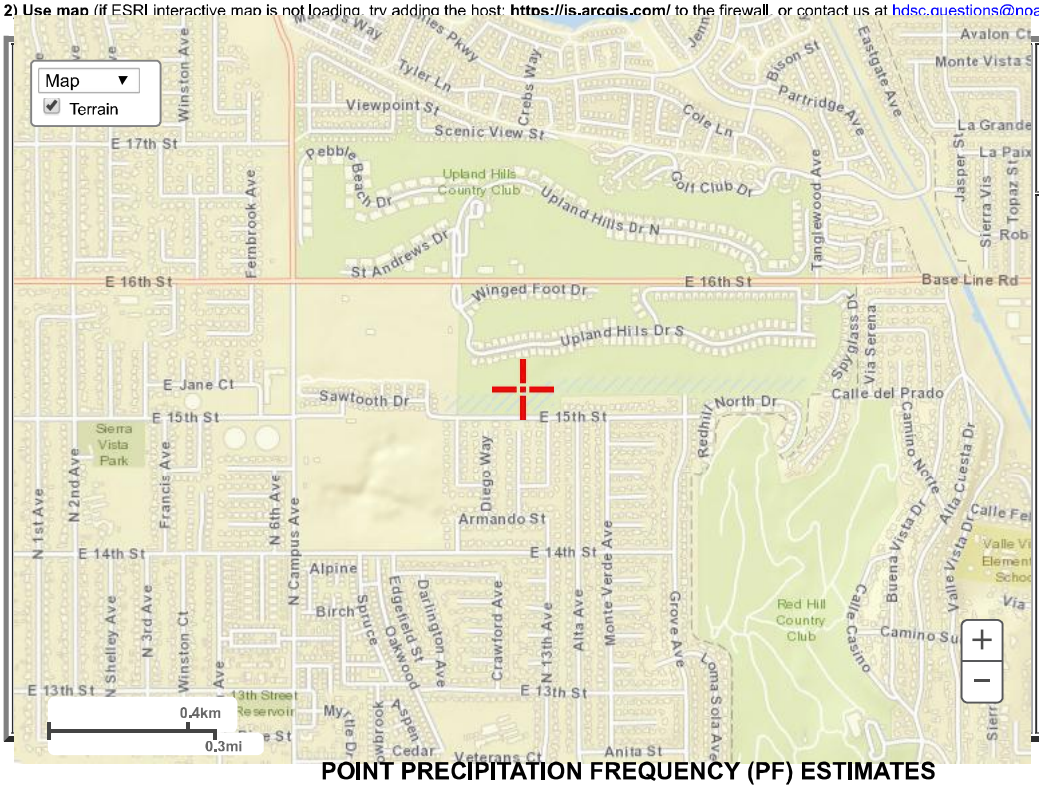
**1) Manually:**

**a) By location** (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

**b) By station** (list of CA stations): Select station ▼

**c) By address** N Himalayas Dr, Upland, CA, 91786, U

**2) Use map** (if ESRI interactive map is not loading, try adding the host: **https://is.arcgis.com/** to the firewall, or contact us at hdsc.questions@noaa.gov):




**a) Select location**
Move crosshair or double click

**b) Click on station icon**
Show stations on map

**Location information:**
**Name:** Upland, California, USA*
**Latitude:** 34.1186°
**Longitude:** -117.6341°
**Elevation:** 1431.09 ft **

* Source: ESRI Maps
** Source: USGS

## POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

**WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION**
**NOAA Atlas 14, Volume 6, Version 2**

**PF tabular** PF graphical Supplementary information Print page

**PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.124** (0.103-0.150) | **0.160** (0.133-0.194) | **0.206** (0.171-0.251) | **0.243** (0.200-0.298) | **0.293** (0.233-0.372) | **0.331** (0.257-0.430) | **0.369** (0.280-0.491) | **0.408** (0.300-0.559) | **0.460** (0.324-0.658) | **0.499** (0.340-0.741) |
| 10-min | **0.178** (0.148-0.216) | **0.229** (0.191-0.278) | **0.295** (0.245-0.359) | **0.349** (0.287-0.428) | **0.420** (0.334-0.534) | **0.474** (0.369-0.616) | **0.529** (0.401-0.704) | **0.584** (0.430-0.801) | **0.659** (0.465-0.943) | **0.716** (0.487-1.06) |
| 15-min | **0.215** (0.179-0.261) | **0.277** (0.231-0.336) | **0.357** (0.297-0.435) | **0.422** (0.347-0.517) | **0.508** (0.404-0.645) | **0.574** (0.446-0.745) | **0.640** (0.485-0.852) | **0.707** (0.521-0.969) | **0.797** (0.562-1.14) | **0.865** (0.589-1.28) |
| 30-min | **0.320** (0.267-0.387) | **0.412** (0.343-0.500) | **0.531** (0.441-0.646) | **0.626** (0.516-0.769) | **0.755** (0.600-0.959) | **0.852** (0.663-1.11) | **0.950** (0.721-1.27) | **1.05** (0.774-1.44) | **1.18** (0.835-1.70) | **1.29** (0.875-1.91) |
| 60-min | **0.489** (0.408-0.593) | **0.630** (0.524-0.764) | **0.812** (0.674-0.988) | **0.958** (0.789-1.18) | **1.16** (0.918-1.47) | **1.30** (1.01-1.69) | **1.45** (1.10-1.94) | **1.61** (1.18-2.20) | **1.81** (1.28-2.59) | **1.97** (1.34-2.92) |
| 2-hr | **0.740** (0.617-0.897) | **0.952** (0.793-1.16) | **1.22** (1.01-1.49) | **1.44** (1.18-1.76) | **1.72** (1.37-2.18) | **1.93** (1.50-2.51) | **2.14** (1.62-2.85) | **2.35** (1.73-3.22) | **2.63** (1.85-3.76) | **2.84** (1.93-4.21) |
| 3-hr | **0.935** (0.779-1.13) | **1.20** (1.00-1.46) | **1.54** (1.28-1.87) | **1.81** (1.49-2.22) | **2.15** (1.71-2.74) | **2.42** (1.88-3.14) | **2.67** (2.03-3.56) | **2.93** (2.16-4.02) | **3.27** (2.31-4.68) | **3.53** (2.40-5.23) |
| 6-hr | **1.34** | **1.73** | **2.21** | **2.59** | **3.09** | **3.47** | **3.83** | **4.20** | **4.69** | **5.05** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1.12-1.63) | (1.44-2.10) | (1.84-2.69) | (2.13-3.18) | (2.46-3.93) | (2.70-4.50) | (2.91-5.11) | (3.10-5.76) | (3.31-6.71) | (3.44-7.49) |
| 12-hr | **1.77** (1.47-2.14) | **2.29** (1.90-2.77) | **2.95** (2.44-3.59) | **3.47** (2.86-4.26) | **4.17** (3.32-5.30) | **4.70** (3.65-6.10) | **5.22** (3.96-6.95) | **5.75** (4.23-7.88) | **6.45** (4.55-9.23) | **6.98** (4.75-10.4) |
| 24-hr | **2.51** (2.22-2.90) | **3.29** (2.91-3.80) | **4.30** (3.79-4.97) | **5.12** (4.47-5.97) | **6.22** (5.27-7.50) | **7.06** (5.86-8.69) | **7.92** (6.41-9.98) | **8.80** (6.93-11.4) | **9.98** (7.55-13.5) | **10.9** (7.97-15.2) |
| 2-day | **3.10** (2.75-3.58) | **4.17** (3.69-4.82) | **5.58** (4.93-6.46) | **6.74** (5.90-7.86) | **8.32** (7.05-10.0) | **9.55** (7.92-11.8) | **10.8** (8.76-13.6) | **12.1** (9.55-15.7) | **13.9** (10.5-18.8) | **15.3** (11.2-21.4) |
| 3-day | **3.34** (2.96-3.85) | **4.58** (4.05-5.28) | **6.23** (5.49-7.20) | **7.58** (6.63-8.85) | **9.46** (8.01-11.4) | **10.9** (9.06-13.4) | **12.4** (10.1-15.7) | **14.0** (11.0-18.1) | **16.2** (12.2-21.8) | **17.9** (13.1-25.0) |
| 4-day | **3.61** (3.19-4.16) | **5.00** (4.42-5.77) | **6.87** (6.05-7.94) | **8.41** (7.36-9.81) | **10.5** (8.93-12.7) | **12.2** (10.1-15.0) | **13.9** (11.3-17.6) | **15.8** (12.4-20.4) | **18.3** (13.8-24.6) | **20.3** (14.8-28.3) |
| 7-day | **4.10** (3.63-4.73) | **5.76** (5.10-6.65) | **8.00** (7.06-9.26) | **9.87** (8.64-11.5) | **12.5** (10.6-15.0) | **14.5** (12.1-17.9) | **16.7** (13.5-21.0) | **18.9** (14.9-24.5) | **22.1** (16.7-29.8) | **24.6** (18.0-34.3) |
| 10-day | **4.43** (3.92-5.10) | **6.26** (5.54-7.23) | **8.74** (7.71-10.1) | **10.8** (9.47-12.6) | **13.7** (11.6-16.6) | **16.0** (13.3-19.7) | **18.5** (14.9-23.3) | **21.0** (16.5-27.2) | **24.6** (18.6-33.1) | **27.4** (20.0-38.3) |
| 20-day | **5.31** (4.70-6.12) | **7.59** (6.71-8.76) | **10.7** (9.43-12.4) | **13.3** (11.6-15.5) | **17.0** (14.4-20.5) | **19.9** (16.5-24.5) | **23.0** (18.6-29.0) | **26.3** (20.7-34.1) | **30.9** (23.4-41.7) | **34.6** (25.3-48.3) |
| 30-day | **6.23** (5.52-7.19) | **8.88** (7.85-10.3) | **12.5** (11.0-14.5) | **15.6** (13.6-18.2) | **19.9** (16.9-24.0) | **23.4** (19.4-28.8) | **27.0** (21.9-34.1) | **30.9** (24.4-40.1) | **36.4** (27.6-49.2) | **40.9** (29.9-57.1) |
| 45-day | **7.47** (6.61-8.61) | **10.5** (9.29-12.1) | **14.7** (12.9-17.0) | **18.2** (15.9-21.2) | **23.2** (19.7-28.0) | **27.3** (22.6-33.5) | **31.5** (25.5-39.7) | **36.1** (28.4-46.7) | **42.6** (32.2-57.4) | **47.8** (34.9-66.7) |
| 60-day | **8.75** (7.74-10.1) | **12.1** (10.7-13.9) | **16.7** (14.7-19.3) | **20.6** (18.0-24.0) | **26.1** (22.1-31.5) | **30.6** (25.4-37.7) | **35.4** (28.7-44.6) | **40.5** (31.9-52.4) | **47.7** (36.1-64.4) | **53.6** (39.2-74.8) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates ▼ Submit

Main Link Categories:
Home | OWP

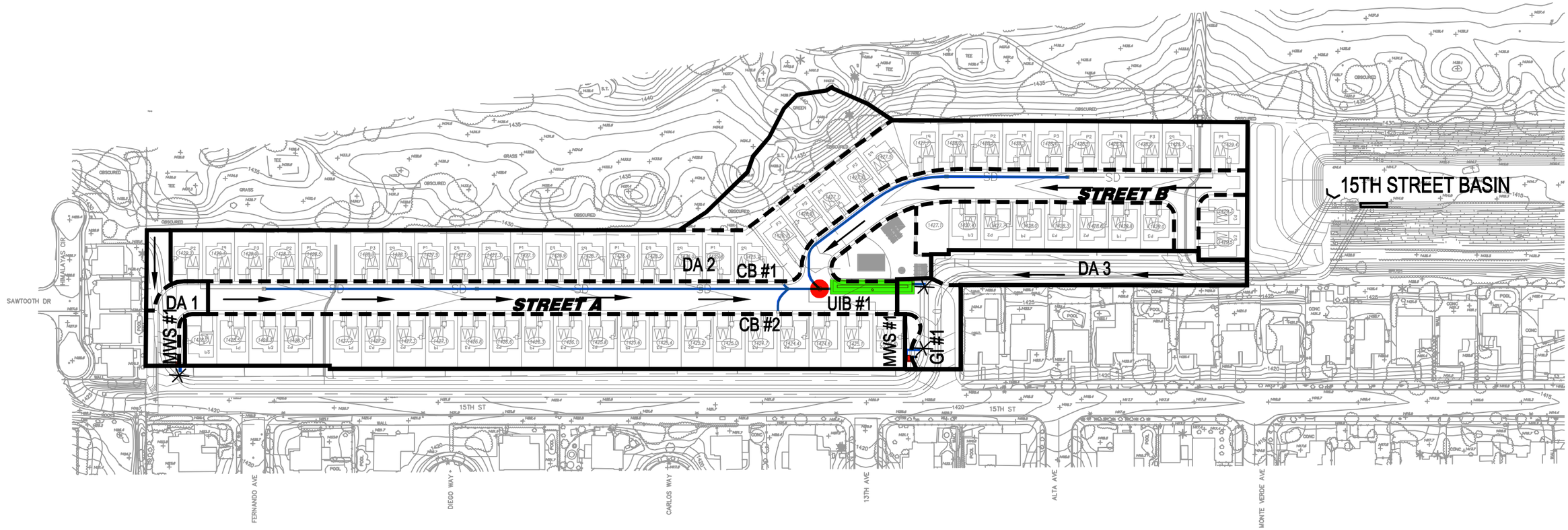
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: HDSC webmaster
Page last modified: April 21, 2017

Map Disclaimer
Disclaimer
Credits
Glossary

Privacy Pc
Abou
Career Opportur

# *APPENDIX B*

# *EXHIBIT A – DRAINAGE PLAN*




## LEGEND

| | |
|---|---|
| | DRAINAGE AREA BOUNDARY |
| DA 1 | DRAINAGE AREA ID |
| MWS #1 | MODULAR WETLAND ID |
| UIB #1 | UNDERGROUND INFILTRATION BASIN NUMBER |
| CB #6 | CATCH BASIN NUMBER |
| GB#1 | GRATE INLET/FILTER INSERT LOCATION |
| MWS #1 | MODULAR WETLAND NUMBER |

| | |
|---|---|
| | UNDERGROUND INFILTRATION BASIN LOCATION |
| | MODULAR WETLAND SYSTEM (MWS) LOCATION |
| | MAIN STORM DRAIN |
| | STORMWATER FLOW DIRECTION |
| | CONNECTION TO PUBLIC SD |
| | PRETREATMENT CDS UNIT |

100′ 50′ 0′ 100′

SCALE: 1″ = 100′

PREPARED BY:

PROACTIVE ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 SOUTH MAIN ST SUITE 300• CORONA, CA 92881
951•280•3300

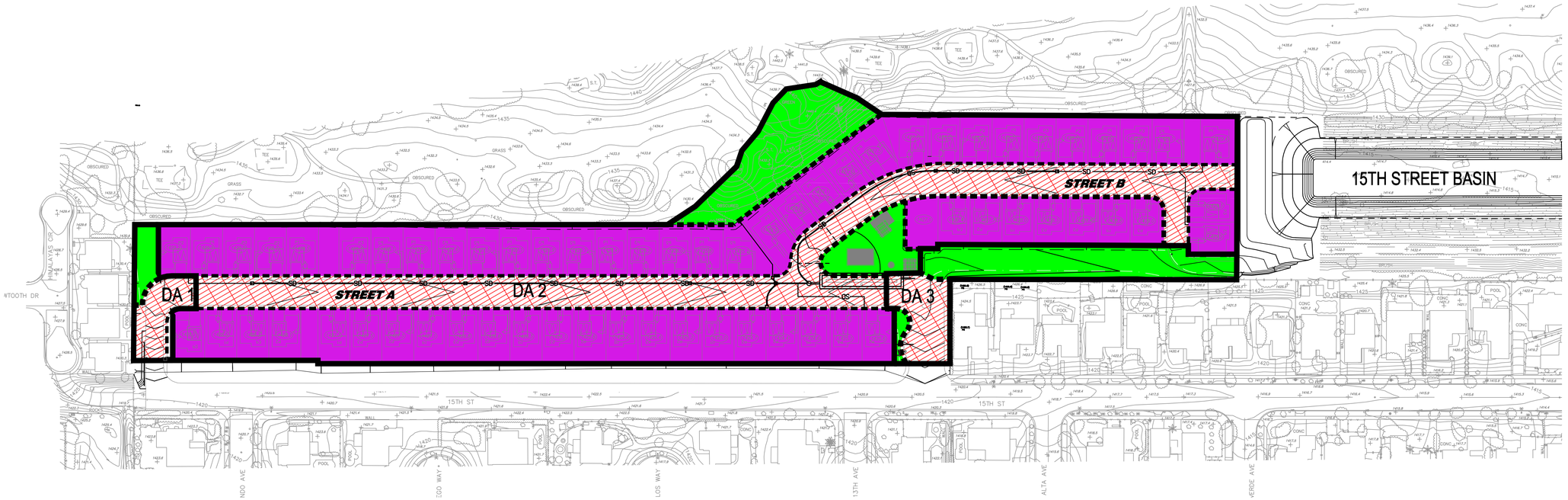
# DRAINAGE PLAN

**EXHIBIT A**
**TRACT NO. 20245**
**CITY OF UPLAND**

**8/23/2018**

Plotted: Sep 20, 2018 - 8:37am by: Sam Aguilar Drawing Name: Z:\10.031_Upland_Basin_Frontier\Hydro\WQMP\EXHIBITS\EXHIBIT A - DRAINAGE PLAN.dwg

# *EXHIBIT B – DRAINAGE AREA CALCULATIONS*




LEGEND

- DRAINAGE AREA BOUNDARY
- SUBAREA AREA BOUNDARY
- DA 1 DRAINAGE AREA ID
- COMMERCIAL AREA
- PARK/LANSCAPE AREA
- RESIDENTIAL AREA SF

| PERVIOUSNESS DATA * | |
|---|---|
| AREA ID | % PERVIOUS |
| COMMERCIAL | 10 |
| PARK AREA | 85 |
| RESIDENTIAL SF | 60 |
| CONDOMINIUM | 35 |

**NOTES:**
*OBTAIN FROM SAN BERNARDINO HYDROLOGY MANUAL

| DA 1 | | |
|---|---|---|
| TOTAL = | 10,751 | |
| AREA ID | AREA (SF) | PERVIOUS AREA (SF) |
| PARK AREA | 3,522 | 2,994 |
| COMMERCIAL | 7,229 | 723 |
| RESIDENTIAL SF | 0 | 0 |
| CONDOMINIUM | 0 | 0 |
| | TOTAL | 3,717 |
| | IMPERVIOUS AREA = | 7,034 |
| | % IMP | 65% |

| DA 2 | | |
|---|---|---|
| TOTAL = | 357,360 | |
| AREA ID | AREA (SF) | PERVIOUS AREA (SF) |
| PARK AREA | 37,504 | 31,878 |
| COMMERCIAL | 83,148 | 8,315 |
| RESIDENTIAL SF | 236,708 | 142,025 |
| CONDOMINIUM | 0 | 0 |
| | TOTAL | 182,218 |
| | IMPERVIOUS AREA = | 175,142 |
| | % IMP | 49% |

| DA 3 | | |
|---|---|---|
| TOTAL = | 48,796.00 | |
| AREA ID | AREA (SF) | PERVIOUS AREA (SF) |
| PARK AREA | 23,539 | 20,008 |
| COMMERCIAL | 9,936 | 994 |
| RESIDENTIAL SF | | 0 |
| CONDOMINIUM | 0 | 0 |
| | TOTAL | 21,002 |
| | IMPERVIOUS AREA = | 27,794 |
| | % IMP | 57% |

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100' 50' 0' 100'
SCALE: 1" = 100'

# DRAINAGE AREA CALCS

**EXHIBIT B**
**TRACT NO. 20245**
**CITY OF UPLAND**

**9/16/2018**

Plotted: Sep 20, 2018 - 8:43am by: Sam Aguilar Drawing Name: Z:\10.031_Upland_Bash_Frontier\Hydro\WQMP\EXHIBITS\EXHIBIT B = DRAINAGE AREA CALCULATIONS.dwg

# *EXHIBIT C – DA SCHEMATIC*

# DRAINAGE AREA SCHEMATIC

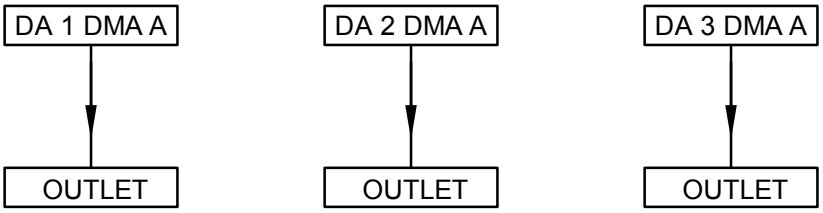



EXHIBIT C

Plotted: Sep 20, 2018 - 9:11am by: Sam Aguilar Drawing Name: Z:\10.031_Upland_Basin_Frontier\Hydro\WQMP\EXHIBITS\EXHIBIT C DA SCHEMATIC.dwg

# *APPENDIX C*

# *BMP DETAILS*

# *CDS UNIT*

CONTECH®
ENGINEERED SOLUTIONS

# CDS Guide
## Operation, Design, Performance and Maintenance



## CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

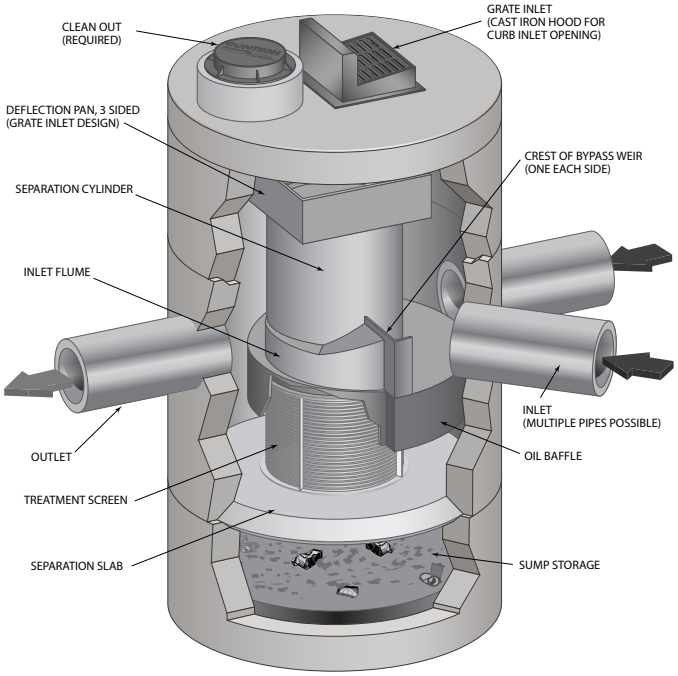
## Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.




## Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns ($\mu$m). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns ($\mu$m) or 50 microns ($\mu$m).

### Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

### Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are

determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

### Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

### Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

### Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

## Performance

### Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 $\mu$m) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 $\mu$m) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

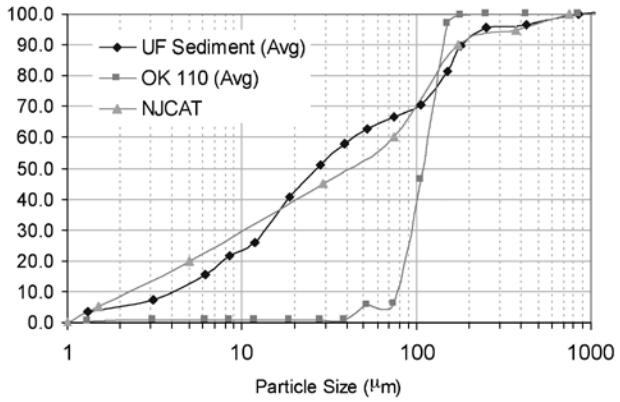



Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

## Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect

to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

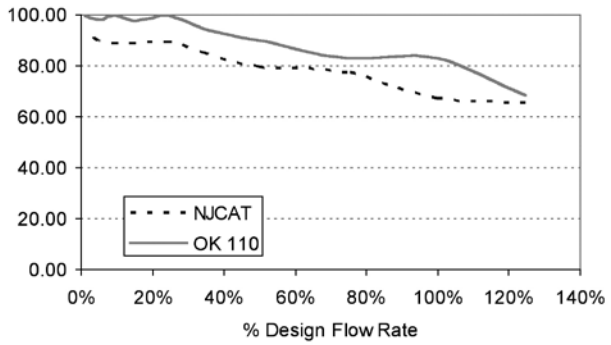



Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 $\mu$m).

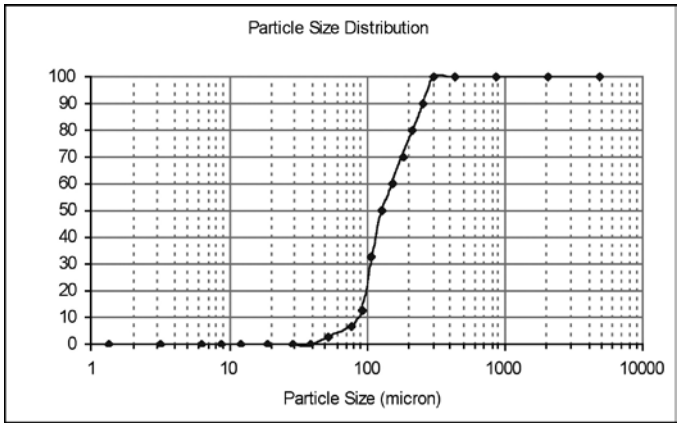



Figure 3. WASDOE PSD

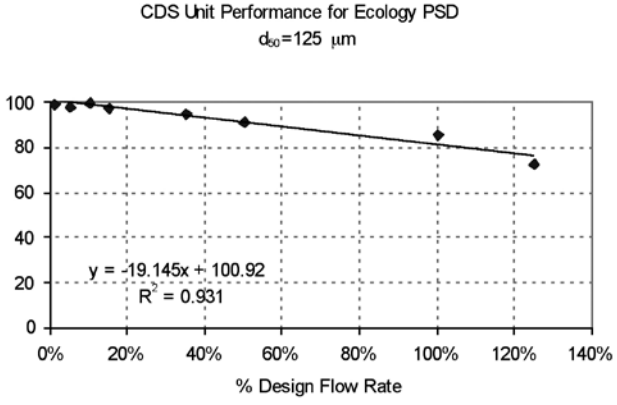



Figure 4. Modeled performance for WASDOE PSD.

## Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified



during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

## Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be cleaned to ensure it is free of trash and debris.

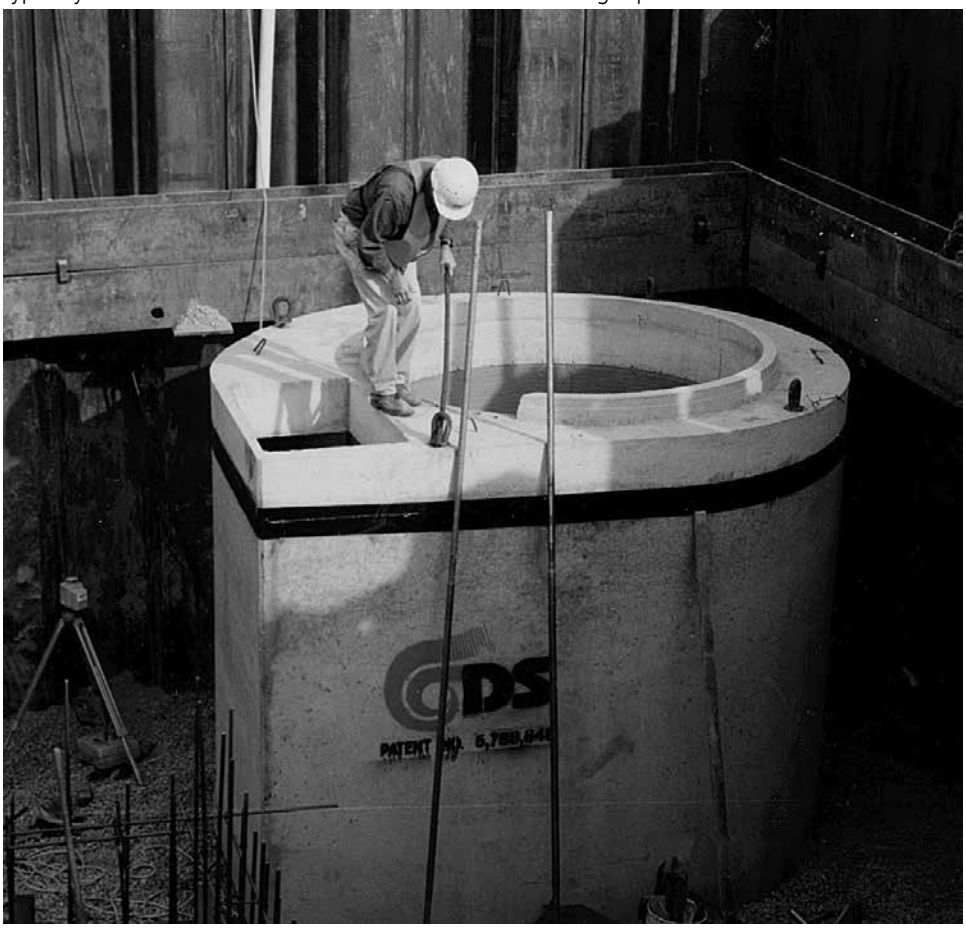
Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.



| CDS Model | Diameter | | Distance from Water Surface to Top of Sediment Pile | | Sediment Storage Capacity | |
|---|---|---|---|---|---|---|
| | ft | m | ft | m | $y^3$ | $m^3$ |
| CDS1515 | 3 | 0.9 | 3.0 | 0.9 | 0.5 | 0.4 |
| CDS2015 | 4 | 1.2 | 3.0 | 0.9 | 0.9 | 0.7 |
| CDS2015 | 5 | 1.5 | 3.0 | 0.9 | 1.3 | 1.0 |
| CDS2020 | 5 | 1.5 | 3.5 | 1.1 | 1.3 | 1.0 |
| CDS2025 | 5 | 1.5 | 4.0 | 1.2 | 1.3 | 1.0 |
| CDS3020 | 6 | 1.8 | 4.0 | 1.2 | 2.1 | 1.6 |
| CDS3025 | 6 | 1.8 | 4.0 | 1.2 | 2.1 | 1.6 |
| CDS3030 | 6 | 1.8 | 4.6 | 1.4 | 2.1 | 1.6 |
| CDS3035 | 6 | 1.8 | 5.0 | 1.5 | 2.1 | 1.6 |
| CDS4030 | 8 | 2.4 | 4.6 | 1.4 | 5.6 | 4.3 |
| CDS4040 | 8 | 2.4 | 5.7 | 1.7 | 5.6 | 4.3 |
| CDS4045 | 8 | 2.4 | 6.2 | 1.9 | 5.6 | 4.3 |
| CDS5640 | 10 | 3.0 | 6.3 | 1.9 | 8.7 | 6.7 |
| CDS5653 | 10 | 3.0 | 7.7 | 2.3 | 8.7 | 6.7 |
| CDS5668 | 10 | 3.0 | 9.3 | 2.8 | 8.7 | 6.7 |
| CDS5678 | 10 | 3.0 | 10.3 | 3.1 | 8.7 | 6.7 |

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



# CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

| Date | Water depth to sediment[1] | Floatable Layer Thickness[2] | Describe Maintenance Performed | Maintenance Personnel | Comments |
|---|---|---|---|---|---|
| | | | | | |
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1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile**.

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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cds_manual 3/17 PDF

RECYCLED PAPER

# *CMP UNDERGROUND PIPE*

# Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

## Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, quarterly inspections. The rate at which the system collects pollutants will depend more on site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

## Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice.

Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Systems are to be rinsed, including above the spring line, annually soon after the spring thaw, and after any additional use of salting agents, as part of the maintenance program for all systems where salting agents may accumulate inside the pipe.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



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CONTECH®
CMP DETENTION SYSTEMS

CONTECH®
ENGINEERED SOLUTIONS

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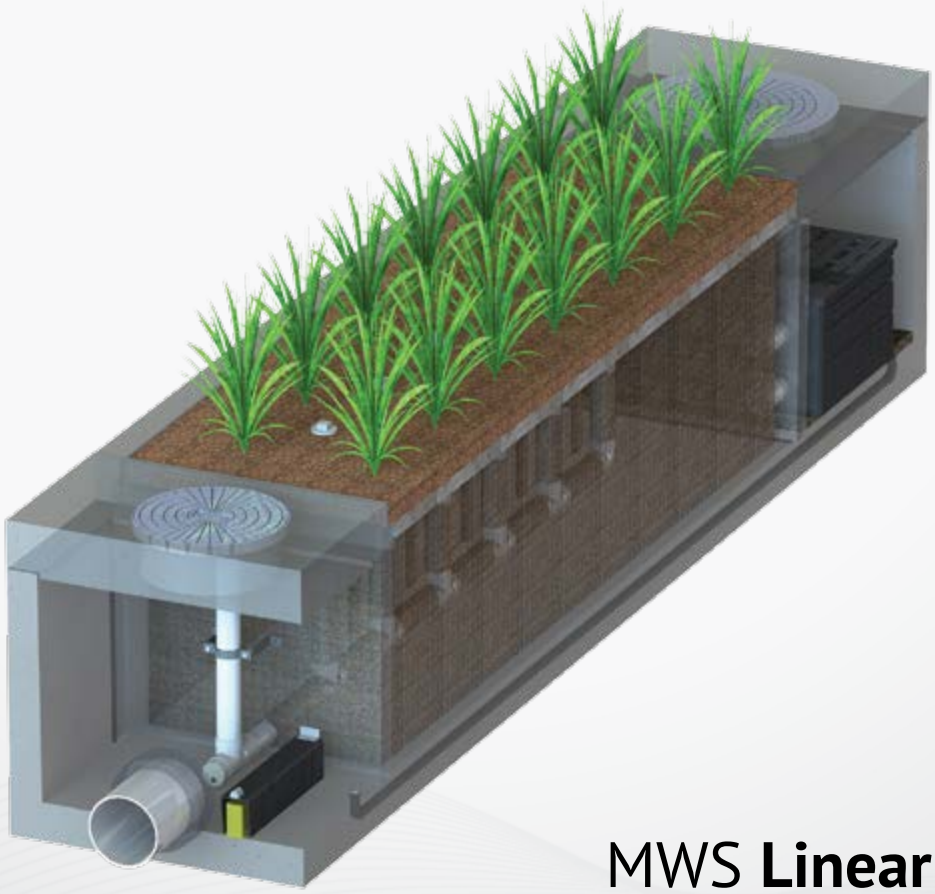
# MODULAR WETLAND SYSTEM (MWS) TECHNICAL SPECIFICATIONS

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



# MWS **Linear**



# Contents


**1** Introduction

**2** Applications

**3** Configurations

**4** Advantages

**5** Operation

**6** Orientations | Bypass

***7*** Performance | Approvals

**8** Sizing

**9** Installation | Maintenance | Plants

# The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.



# Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.






# MWS **Linear**

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

# Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.



## Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.



## Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



## Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.



## Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.



## Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.



## Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

**More applications** are available on our website: www.ModularWetlands.com/Applications

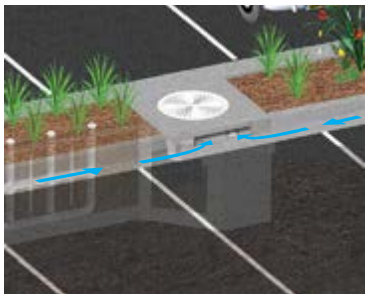
- Agriculture
- Reuse
- Low Impact Development
- Waste Water





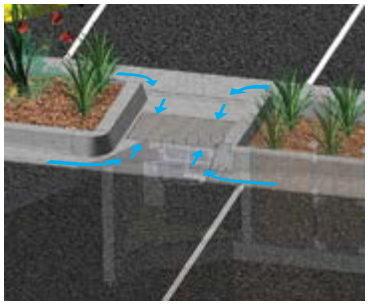
# Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.



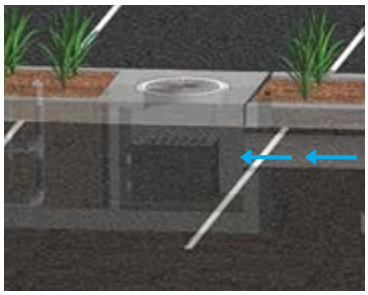
## Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



## Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



## Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.



## Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

# Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

### Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

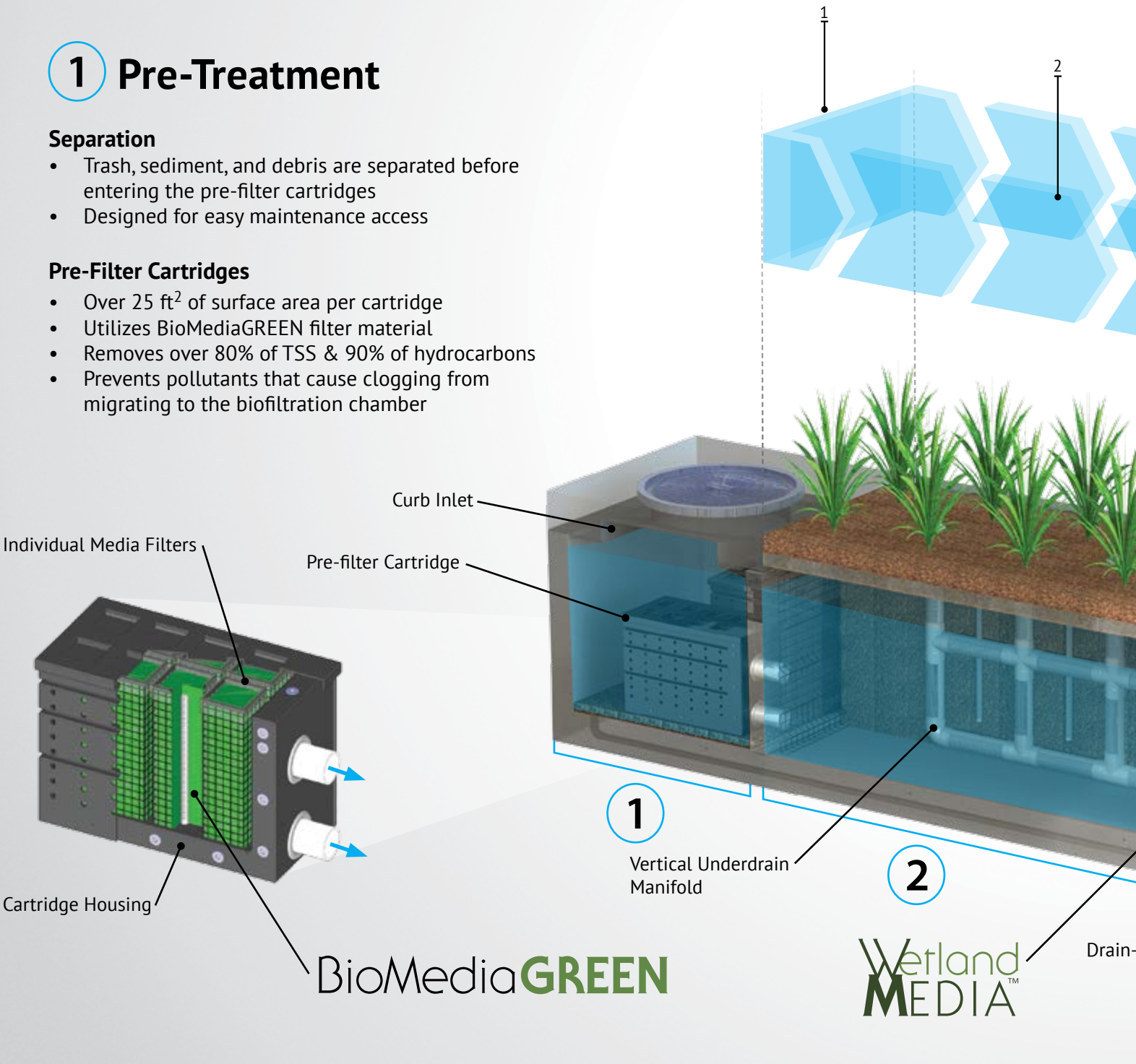
## 1 Pre-Treatment

### Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

### Pre-Filter Cartridges

- Over 25 $ft^2$ of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



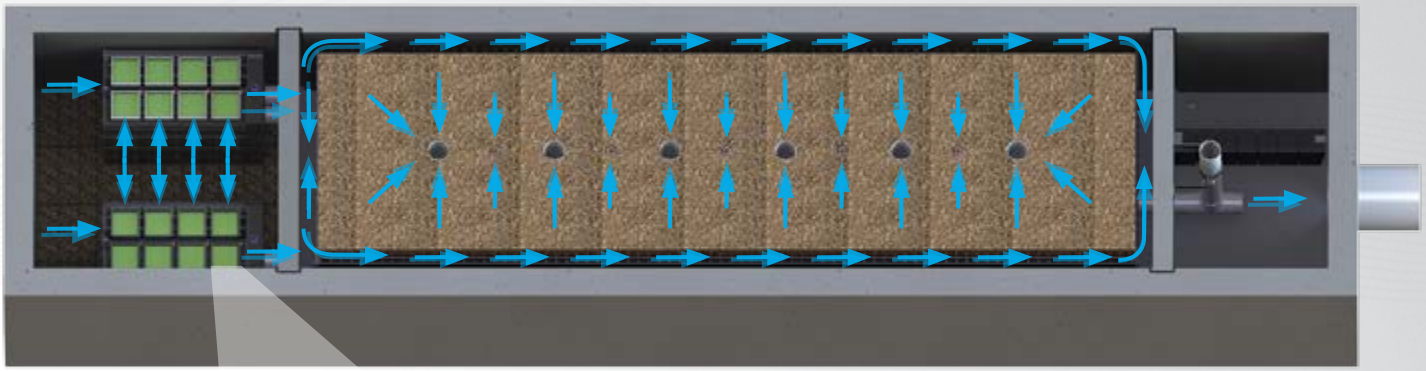


Fig. 2 - Top View

**2x to 3x More Surface Area** Than Traditional Downward Flow Bioretention Systems.



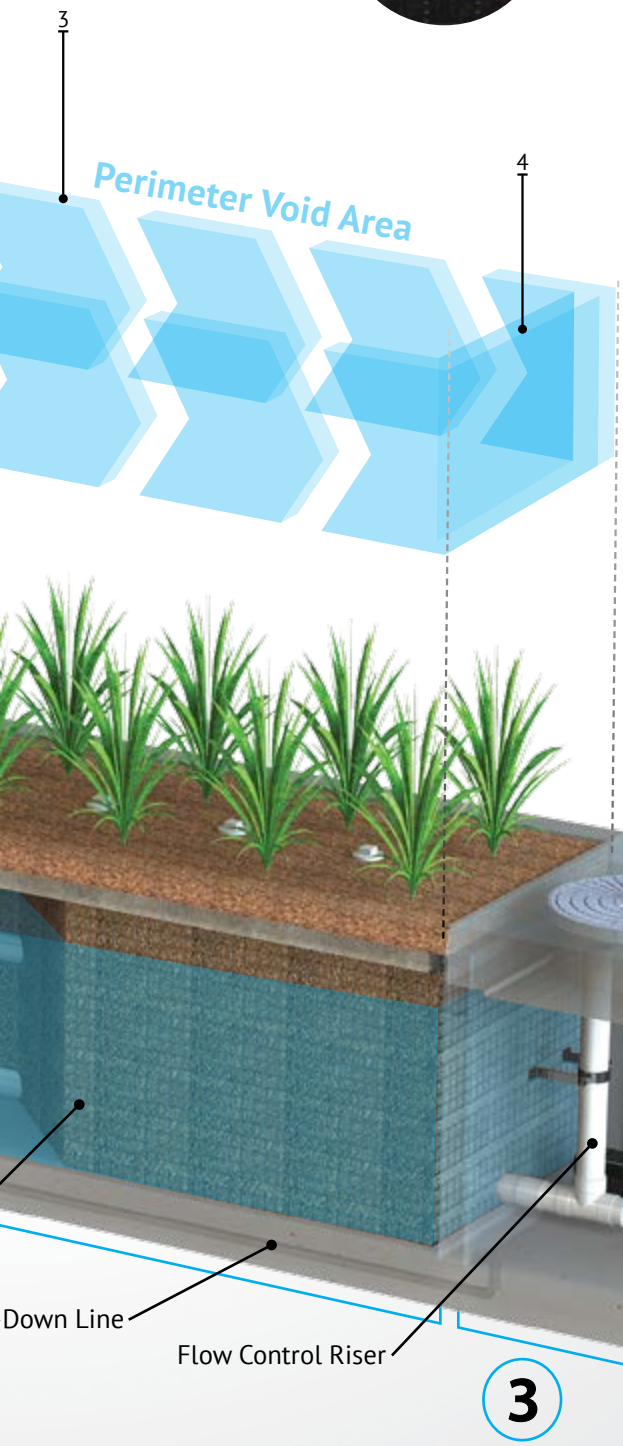



Fig. 1

## 2 Biofiltration

### Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

### Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

### WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

## 3 Discharge

### Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

### Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

# Orientations



### Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



### End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

# Bypass

### Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

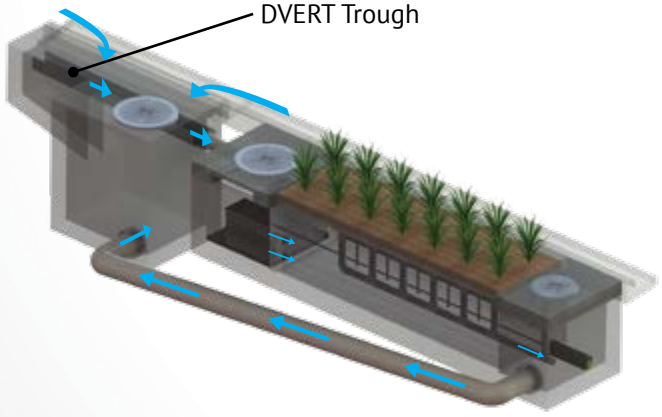
### External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

### Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

### DVERT Low Flow Diversion




This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.





# Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

# Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

## Washington State TAPE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft$^2$ loading rate. The highest performing BMP on the market for all main pollutant categories.

| TSS | Total Phosphorus | Ortho Phosphorus | Nitrogen | Dissolved Zinc | Dissolved Copper | Total Zinc | Total Copper | Motor Oil |
|---|---|---|---|---|---|---|---|---|
| 85% | 64% | 67% | 45% | 66% | 38% | 69% | 50% | 95% |

## DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

## Maryland Department Of The Environment Approved

Granted ESD (Environmental Site Design) status for new construction, redevelopment and retrofitting when designed in accordance with the Design Manual.

## MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

## Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus, and 30% Total Nitrogen.

# Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

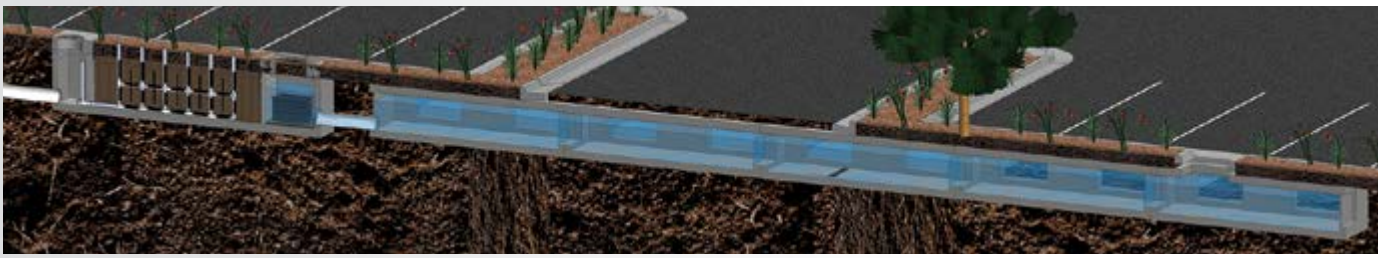


## Treatment Flow Sizing Table

| Model # | Dimensions | WetlandMedia Surface Area | Treatment Flow Rate (cfs) |
|---|---|---|---|
| MWS-L-4-4 | 4' x 4' | 23 $ft^2$ | 0.052 |
| MWS-L-4-6 | 4' x 6' | 32 $ft^2$ | 0.073 |
| MWS-L-4-8 | 4' x 8' | 50 $ft^2$ | 0.115 |
| MWS-L-4-13 | 4' x 13' | 63 $ft^2$ | 0.144 |
| MWS-L-4-15 | 4' x 15' | 76 $ft^2$ | 0.175 |
| MWS-L-4-17 | 4' x 17' | 90 $ft^2$ | 0.206 |
| MWS-L-4-19 | 4' x 19' | 103 $ft^2$ | 0.237 |
| MWS-L-4-21 | 4' x 21' | 117 $ft^2$ | 0.268 |
| MWS-L-8-8 | 8' x 8' | 100 $ft^2$ | 0.230 |
| MWS-L-8-12 | 8' x 12' | 151 $ft^2$ | 0.346 |
| MWS-L-8-16 | 8' x 16' | 201 $ft^2$ | 0.462 |

# Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



## Treatment Volume Sizing Table

| Model # | Treatment Capacity (cu. ft.) @ 24-Hour Drain Down | Treatment Capacity (cu. ft.) @ 48-Hour Drain Down |
|---|---|---|
| MWS-L-4-4 | 1140 | 2280 |
| MWS-L-4-6 | 1600 | 3200 |
| MWS-L-4-8 | 2518 | 5036 |
| MWS-L-4-13 | 3131 | 6261 |
| MWS-L-4-15 | 3811 | 7623 |
| MWS-L-4-17 | 4492 | 8984 |
| MWS-L-4-19 | 5172 | 10345 |
| MWS-L-4-21 | 5853 | 11706 |
| MWS-L-8-8 | 5036 | 10072 |
| MWS-L-8-12 | 7554 | 15109 |
| MWS-L-8-16 | 10073 | 20145 |

# Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.




# Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.



# Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit **www.ModularWetlands.com/Plants** for more information and various plant lists.



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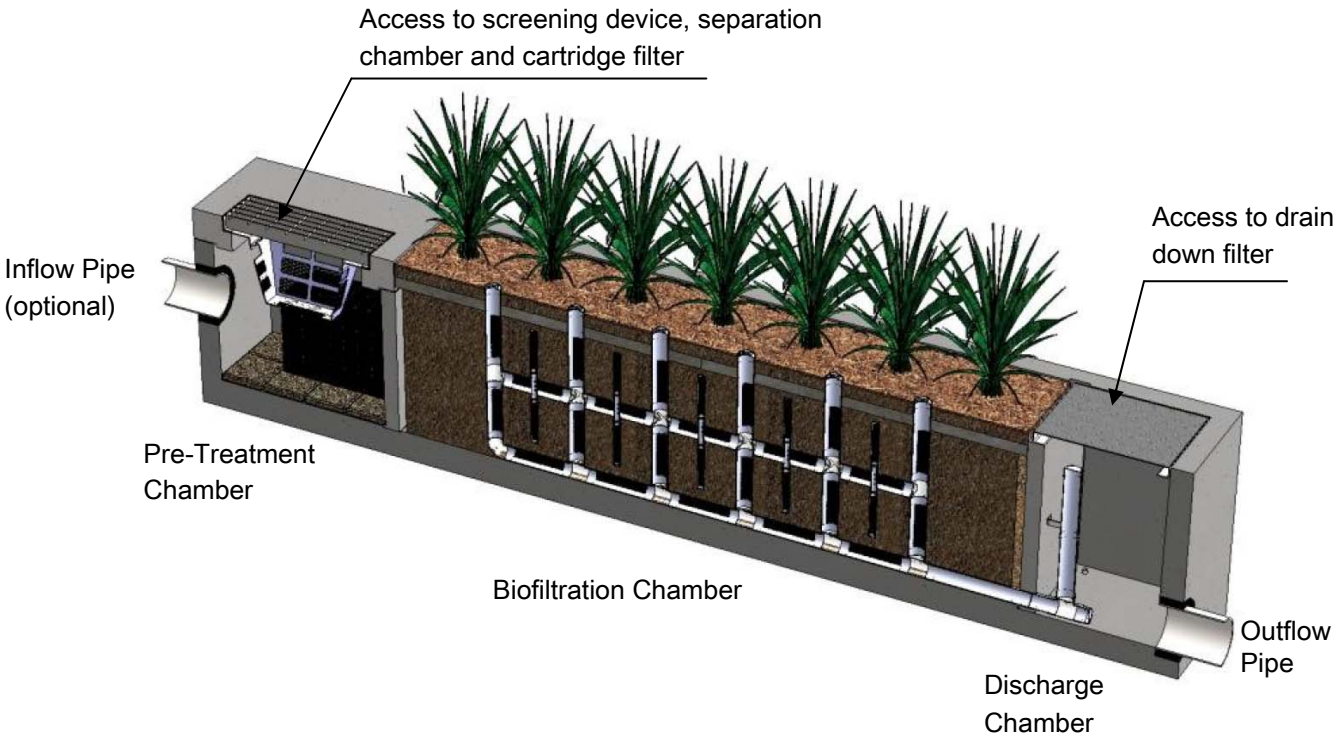
www.ModularWetlands.com | (855) 5MOD-WET | info@ModularWetlands.com

# Maintenance Guidelines for Modular Wetland System - Linear

## Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

## System Diagram



# Maintenance Procedures

## Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

## Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

## Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

## Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

# Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

# Maintenance Procedure Illustration

## Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



## Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.







## Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.








## Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.



## Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.









# Inspection Form



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

# Inspection Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

## Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

| **Structural Integrity:** | **Yes** | **No** | **Comments** |
|---|---|---|---|
| Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)? | | | |
| Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly? | | | |
| **Working Condition:** | | | |
| Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit? | | | |
| Is there standing water in inappropriate areas after a dry period? | | | |
| Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system? | | | |
| Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber. | | | Depth: |
| Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber? | | | Chamber: |
| Any signs of improper functioning in the discharge chamber? Note issues in comments section. | | | |
| **Other Inspection Items:** | | | |
| Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)? | | | |
| Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below. | | | |
| Is there a septic or foul odor coming from inside the system? | | | |

| **Waste:** | **Yes** | **No** |
|---|---|---|
| Sediment / Silt / Clay | | |
| Trash / Bags / Bottles | | |
| Green Waste / Leaves / Foliage | | |

| **Recommended Maintenance** | |
|---|---|
| No Cleaning Needed | |
| Schedule Maintenance as Planned | |
| Needs Immediate Maintenance | |

| **Plant Information** | |
|---|---|
| Damage to Plants | |
| Plant Replacement | |
| Plant Trimming | |

Additional Notes:

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

# Maintenance Report




Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

# Cleaning and Maintenance Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

| Site Map # | GPS Coordinates of Insert | Manufacturer / Description / Sizing | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Total Debris Accumulation | Condition of Media 25/50/75/100 (will be changed @ 75%) | Operational Per Manufactures' Specifications (If not, why?) |
|---|---|---|---|---|---|---|---|---|
| | Lat:<br>Long: | MWS Catch Basins | | | | | | |
| | | MWS Sedimentation Basin | | | | | | |
| | | Media Filter Condition | | | | | | |
| | | Plant Condition | | | | | | |
| | | Drain Down Media Condition | | | | | | |
| | | Discharge Chamber Condition | | | | | | |
| | | Drain Down Pipe Condition | | | | | | |
| | | Inlet and Outlet Pipe Condition | | | | | | |

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

# *BMP EDUCATIONAL MATERIAL*

# SAN BERNARDINO COUNTY
## STORMWATER POLLUTION PREVENTION

### Commercial landscape maintenance:

Yard waste, sediments and toxic lawn and garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.

- **Recycle Yard Waste:** Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Let your customers know about grass cycling --the natural recycling of grass by leaving clippings on the lawn when mowing instead of using a grass catcher. Grass clippings will quickly decompose, returning valuable nutrients to the soil. You can get more information at www.ciwmb.ca.gov/Organics.
- **Use Fertilizers, Herbicides & Pesticides Safely:** Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use natural, non-toxic alternatives to traditional garden chemicals. If you must use chemical fertilizers, herbicides, or pesticides spot apply rather than blanketing entire areas, avoid applying near curbs and driveways and never apply before a rain.
- **Recycle Hazardous Waste:** Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility. For information on proper disposal, call (909) 386-8401.
- **Use Water Wisely:** Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads.



- **Planting:** Plant native vegetation to reduce the need of water, fertilizers, herbicides and pesticides.
- **Prevent Erosion:** Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways. Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff. Avoid excavation or grading during wet weather.



- **Store Materials Safely:** Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials should be covered with plastic sheeting to protect from rain, wind and runoff.

**For more information about how you can prevent stormwater pollution:**

**www.sbcountystormwater.org**

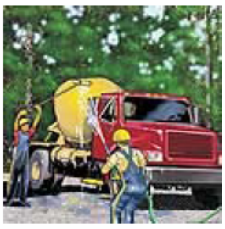
# SAN BERNARDINO COUNTY
## STORMWATER POLLUTION PREVENTION

### Construction & development:

Soil, cement wash, asphalt, oil and other hazardous debris from construction sites often make their way into the San Bernardino County storm drain system, and flow untreated into local waterways. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.



- **Store Materials Safely:** Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.
- **Preventing Erosion:** Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydro mulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Use gravel approaches where truck traffic is frequent to reduce soil compaction and limit the tracking of sediment into the streets. For more information on erosion control, call (909) 799-7407.



- **Cleaning & Preventing Spills:** Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.
- **Maintaining Vehicles & Equipment:** Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, and brake and radiator fluids.
- **Ordering Materials & Recycling Waste:** Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Dispose of hazardous materials through a hazardous waste hauler or other means in accordance with the construction permit. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.
- **Concrete and mortar application:** Never dispose of cement washout into driveways, streets, gutters or drainage ditches. Wash concrete mixers and equipment only in specified washout areas, where the water flows into lined containment ponds. Cement wash water can be recycled by pumping it back into cement mixers for reuse.

**For more information about how you can prevent stormwater pollution:**

**www.sbcountystormwater.org**

# STORMWATER Pollution Prevention

## CONSTRUCTION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



**Store Materials Safely**
Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



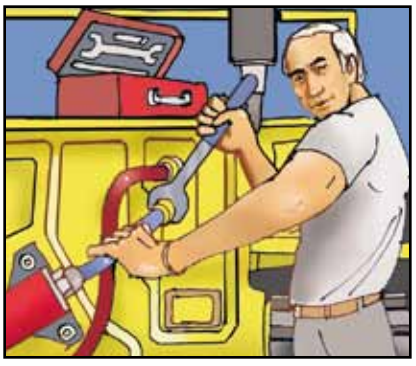
**Ordering Materials & Recycling Waste**
Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.




**Cleaning & Preventing Spills**
Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.



**Preventing Erosion**
Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydromulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Channels can be lined with grass or roughened pavement to reduce runoff velocity.



**Maintaining Vehicles & Equipment**
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.



To report illegal dumping call
**(877) WASTE18**
**sbcountystormwater.org**

San Bernardino County STORMWATER PROGRAM

# Prevención de Contaminación del Desagüe

## CONSTRUCCIÓN

Cemento, sedimentos, liquidos de auto, polvos y residuos peligrosos acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



**Almacenando Materiales Cuidadosamente**

Manten materiales de construcción y residuos lejos de las calles, coladeras y desagües. Manten tapados los bultos de arena, grava y herramientas para excavar cuviertos con algun plastico para protejerlos de la lluvia, el aire y el desagüe.



**Ordenando Materiales & Reciclando Desechos**

Reduce la cantidad al ordenar el material, solo ordena lo necesario. Usa materiales que se puedan reciclar cuando sea posible. Se puede reciclar el aspfalto, concreto, madera y la vegetacion. Materiales no reciclados se deven llevar a lugares de desechos peligrosos. Para mas información llama al (909) 386-8401.



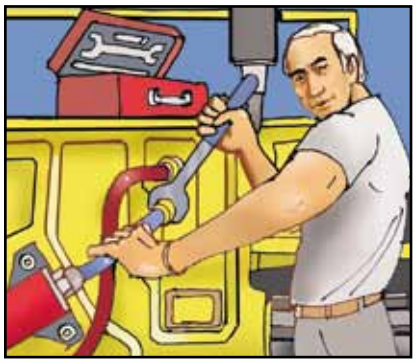

**Limpiando & Previniendo Derrames**

Usa siempre un enbudo al vaciar liquidos. Barre los derrames en ves de lavarlos con la manguera. Mantente siempre preparado para cualquier derrame, usa siempre las herramientas de seguridad al igual que materiales como, tierra para desechos de gato o aserrin. Para reportar derrames llama al 911.



**Previniendo Erosiones**

Evita las excavaciones durante lluvia. Planta vegetacion temporal en colinas donde aun no hay planes de construccion y planta vegetacion permanente al terminar las excavaciones. Construye algunos canales para el desagüe. Estos pueden ser creados con pasto y cemento para reducir la velocidad del desagüe.



**Mantenimiento de Vehiculos & Herramientas**

Has el mantenimiento y carga de vehiculos en el mismo lugar, lejos de la calle, las alcantarillas y los drenajes. Inspecciona los vehiculos y el equipo de cualquier goteadura y preveen goteaduras de autos que no se usan vasiandoles la gasolina, aceite de transmision, frenos y liquidos del radiador.



Para reportar actividades ilegales llamar al:

**(877) WASTE18**

**sbcountystormwater.org**

San Bernardino County STORMWATER PROGRAM

# STORMWATER Pollution Prevention

## ROADWORK AND PAVING

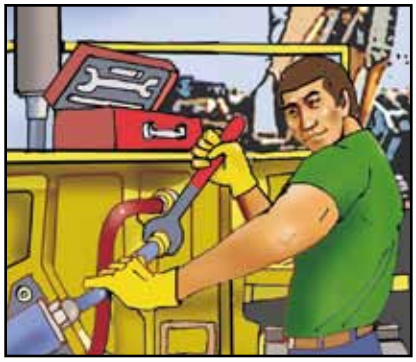
Asphalt, saw-cut slurry and excavated materials from road paving, surfacing and pavement removal often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



**Preventing Erosion**
Schedule excavation and grading work during dry weather. Develop and implement erosion and sediment control plans for excavated embankments. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



**During Construction**
Cover catch basins and maintenance holes when applying seal coat, slurry seal or fog seal. Use check dams, ditches or berms around excavations, and avoid over applying water for dust control. Never wash excess materials from exposed aggregate or concrete into the street, gutter or a storm drain.



**Maintaining Vehicles & Equipment**
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.

**Asphalt & Concrete Removal**
Barricade storm drain openings during saw-cutting, and recycle broken up pavement at a crushing company. For recycling information, call (909) 386-8401.



**Cleaning & Preventing Spills**
Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Sweep up dry spills, instead of hosing. Prevent spills from paver machines by using drip pans, or by placing absorbent materials like cloths or rags under the machines when not in use. To report serious spills, call 911.




To report illegal dumping call

**(877) WASTE18**

**sbcountystormwater.org**

San Bernardino County STORMWATER PROGRAM

# Prevención de Contaminación del Desagüe

## TRABAJO DE CARRETERAS & PAVIMENTO

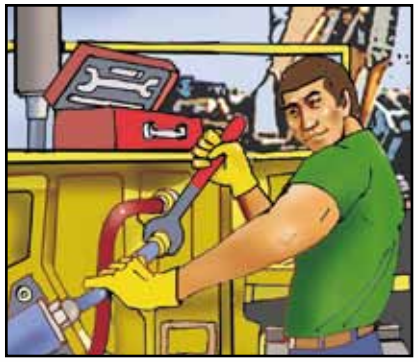
Asfalto, mezcla y materiales de excavaciones del pavimento acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



**Previniendo Erosiones**
Planea las excavaciones trabajo de jardineria durante el clima seco. Desarrolla e implementa planes de embancamientos de control de sedimento y excavaciones. Cubre montones de tierra, grava y otros materiales con un plastico para protejerlos de la llvia, aire y desagüe.



**Durante Construcción**
Cubre los lavados y da mantenimiento a los hoyos al aplicar selladura o mezcla. Revisa las areas de excavaciones, y evita pasarte de agua para preveenir polvadura. Nunca laves los materiales llenos de concreto en la calle, drenajes o en el desagüe.



**Mantenimiento de Vehiculos & Herramientas**
Has el mantenimiento y carga de vehiculos en el mismo lugar, lejos de la calle, las alcantarillas y los drenajes. Inspecciona los vehiculos y el equipo de cualquier goteadura y evita goteaduras de autos que no se usan vasiandoles la gasolina, aceite de transmision, frenos y liquidos del radiador.

**Removiendo Asfalto & Concreto**
Bloquea alrededor de los drenajes cuando estes usando las maquinas de sierra, tambien recicla todo el pavimento roto en la compañia demolidora. Para más información llama al (909) 386-8401.



**Limpiando & Previniendo Derrames**
Mantente siempre preparado para cualquier derrame, usa siempre las herramientas de seguridad al igual que materiales como, tierra para desechos de gato o aserrin Barre los derrames en ves de lavarlos con la manguera. Previene los derrames de las maquinas usando enbudos o colocanto garras para absorver cualquier liquido. Para reportar derrames llama al 911.




Para reportar actividades ilegales llamar al:

**(877) WASTE18**

**sbcountystormwater.org**

San Bernardino County STORMWATER PROGRAM

**San Bernardino County Stormwater Program**
825 East Third Street · Room 127
San Bernardino, CA 94215-0835

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# STORMWATER Pollution Prevention

## Stormwater Management Practices for Commercial Landscape Maintenance

Yard waste, sediments, and toxic lawn/garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Following these best management practices will prevent pollution, comply with regulations and protect public health.

### Recycle Yard Waste

Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Try grasscycling - the natural recycling of grass by leaving clippings on the lawn when mowing. Grass clippings will quickly decompose, returning valuable nutrients to the soil. Further information can be obtained at www.ciwmb.ca.gov/Organics.

### Use Fertilizers, Herbicides and Pesticides Safely

Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use of natural, non-toxic alternatives to the traditional fertilizers, herbicides and pesticides is highly recommended. If you must use chemical fertilizers, herbicides, or pesticides:



- Spot apply pesticides and herbicides, rather than blanketing entire areas.
- Avoid applying near curbs and driveways, and never apply before a rain.
- Apply fertilizers as needed, when plants can best use it, and when the potential for it being carried away by runoff is low.

### Recycle Hazardous Waste

Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility, which accepts these types of materials. For information on proper disposal call, (909) 386-8401.

### Use Water Wisely

Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads. Plant native vegetation to reduce the need of water, fertilizers, herbicides, and pesticides.

### Prevent Erosion

Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways.

- Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff.
- Avoid excavation or grading during wet weather.

### Store Materials Safely

Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials must be covered with plastic sheeting to protect from rain, wind and runoff.

San Bernardino County STORMWATER PROGRAM

To report illegal dumping call

**(877) WASTE18**

or visit our website:

**sbcountystormwater.org**

# Stormwater Pollution Prevention

## *Best Management Practices for Homeowner's Associations, Property Managers and Property Owners*

*Your Guide To Maintaining Water Friendly Standards In Your Community*

**sbcountystormwater.org**

Big Bear · Chino · Chino Hills · Colton · Fontana · Grand Terrace · Highland · Loma Linda · Montclair · Ontario · Rancho Cucamonga
Redlands · Rialto · San Bernardino · San Bernardino County · San Bernardino County Flood Control District · Upland · Yucaipa

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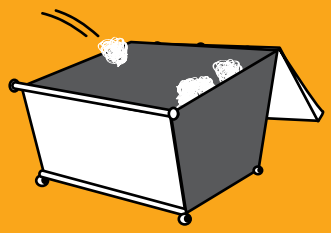
# COMMERCIAL TRASH ENCLOSURES

## FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

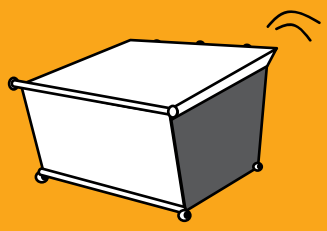
### PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

#### PUT TRASH INSIDE



Place trash inside the bin (preferably in sealed bags)

#### CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

#### KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

### SOME ADDITIONAL GUIDELINES, INCLUDE

**✓ SWEEP FREQUENTLY**
Sweep trash enclosure areas frequently, instead of hosing them down, to prevent polluted water from flowing into the streets and storm drains.

**✓ FIX LEAKS**
Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

**✓ CONSTRUCT ROOF**
Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

**THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!**

San Bernardino County STORMWATER PROGRAM

In the event of a spill or discharge to a storm drain or waterway, contact San Bernadino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

**sbcountystormwater.org**

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Redlands • Rialto • San Bernadino • San Bernadino County • San Bernadino County Flood Control District • Upland • Yucaipa

# CESQG PROGRAM

**Conditionally Exempt Small Quantity Generator**

## WHAT IS A CESQG?

Businesses that generate 27 gallons or 220 lbs. of hazardous waste, or 2.2 lbs. of extremely hazardous waste per month are called "Conditionally Exempt Small Quantity Generators," or CESQGs. San Bernardino County Household Hazardous Program provides waste management services to CESQG businesses. The most common CESQGs in San Bernardino County are painters, print shops, auto shops, builders, agricultural operators and property managers, but there are many others. When you call, be ready to describe the types and amounts of waste your business generates in a typical month. If you generate hazardous waste on a regular basis, you must:

- Register with San Bernardino County Fire Department (909) 386-8401 as a hazardous waste generator.
- To obtain an EPA ID# and application form from the State visit www.dtsc.ca.gov.
- Manage hazardous waste in accordance with all applicable local, state and federal laws and regulations.

## HOW DO I GET SERVICE?

To arrange an appointment for the CESQG Program, call 1-800-OILY CAT or 909-382-5401. Be ready to describe the type and amount of hazardous waste your business is ready to dispose of, and the types and size(s) of containers that the waste is in.

## Waste Type and Cost

There is a small handling fee involved in the collection of hazardous waste from your business. Disposal costs depend on the type of waste.

| | |
|---|---|
| Aerosols | $1.29/lb. |
| Automobile motor oil | $.73/gal. |
| Anti-freeze | $1.57/gal. |
| Contaminated oil | $4.48/gal. |
| Car batteries | $.62/ea. |
| Corrosive liquids, solids | $2.80/lb. |
| Flammable solids, liquids | $1.57/lb. |
| Latex Paint | $.73/lb. |
| Mercury | $10.08/lb. |
| NiCad/Alkaline Batteries | $2.13/lb. |
| Oil Base Paints | $1.00/lb. |
| Oil Filters | $.56/ea. |
| Oxidizers | $9.63/lb. |
| PCB Ballasts | $5.94/lb. |
| Pesticides (most) | $2.91/lb. |
| Photofixer, developer | $4.31/gal. |
| Television & Monitors | $11.20/ea. |
| Additional Handling | $138.00/hr. |

*Rates subject to change without notice*

## WE CANNOT ACCEPT

- Radioactives
- Water reactives
- Explosives
- Compressed gas cylinders
- Medical or biohazardous waste
- Asbestos
- Remediation wastes

# HAZARDOUS WASTE

## WHY IS THE FIRE DEPARTMENT COLLECTING HAZARDOUS WASTE?

Small Quantity Generators often have difficulty disposing of small quantities of hazardous waste. Hazardous waste companies usually have a minimum amount of waste that they will pick up, or charge a minimum fee for service. Typically, the minimum fee exceeds the cost of disposal for the hazardous waste. This leaves the small quantity generator in a difficult situation. Some respond by storing hazardous waste until it becomes economical for the hazardous waste transporter to pick it up, putting the business out of compliance by exceeding regulatory accumulation time limits. Other businesses simply store their hazardous wastes indefinitely, creating an unsafe work environment and exceeding accumulation time limits. Yet other businesses attempt to illegally dispose of their waste at household hazardous waste collection facilities. These facilities are not legally permitted to accept commercial wastes, nor are prepared to provide legal documentation for commercial hazardous waste disposal. In answer to the problems identified above, the San Bernardino County Fire Department Household Hazardous Program instituted the Conditionally Exempt Small Quantity Generator Program.

## PAYMENT FOR SERVICES

The CESQG Program will prepare an invoice for your business at the time of service. You can pay at the time of service with cash or a check, or you can mail your payment to the Fire Department within 30 days. Please note that we do not accept credit card payments. The preferred method of payment is to handle payment at time of service. Additional charges may apply for accounts not paid within 30 days.

## ARE THERE ANY OTHER WAYS THAT I CAN SAVE MONEY ON HAZARDOUS WASTE DISPOSAL?

Yes! First, start by reducing the amount of waste that you produce by changing processes or process chemicals, at your business. Next, examine if there is a way that you can recycle your waste back into your processes. Network with similar businesses or trade associations for waste minimization and pollution prevention solutions.

## WHAT IF YOUR BUSINESS DOES NOT QUALIFY?

Call the San Bernardino County Fire Department Field Services Division for assistance with hazardous waste management at 909-386-8401. If you reduce the amount of waste you generate each month to 27 gallons or less, you may qualify in the future.

## WHAT HAPPENS TO YOUR HAZARDOUS WASTE?

Hazardous waste collected by the CESQG Program is transported to a state permitted processing facility in San Bernardino. The waste is further processed at this point and packaged for off-site recycling (oil filters, oil, latex paint, antifreeze, and batteries) or destructive incineration (pesticides, corrosives, flammables, oil based paint).

San Bernardino County Fire Department
CESQG Program
2824 East "W" Street
San Bernardino, CA 92415-0799
Phone: 909-382-5401
Fax: 909-382-5413
www.sbcfire.org/hazmat/hhw.asp
Email: jschwab@sbcfire.org

# WHEN WORKING OUTDOORS USE THE 3Cs

## CUANDO TRABAJE AL AIRE LIBRE UTILICE LAS 3Cs

### CONTROL | CONTROL



Locate the nearest storm drain and ensure nothing can enter or be discharged into it.

*Ubique el desagüe de aguas pluviales más cercano y asegúrese de que nada pueda ingresar a éste ni descargarse en él.*

### CONTAIN | CONTENER



Isolate your area to prevent material from potentially flowing or being blown away.

*Aísle su área para evitar que el material pueda discurrirse o ser llevado por el viento.*

### CAPTURE | CAPTURAR



Sweep up debris and place it in the trash. Clean up spills with an absorbent material (e.g. kitty litter) or vacuum with a Wet-Vac and dispose of properly.

*Recoja los restos y colóquelos en la basura. Limpie los derrames con un material absorbente (como la arena para gatos) o aspírelos con una Wet-Vac (aspiradora de humedad) y deséchelos correctamente.*

# COMMERCIAL LANDSCAPE

Yard waste, sediments, and toxic lawn/garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Following these best management practices will prevent pollution, comply with regulations and protect public health.

**Recycle Yard Waste**
Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Try grasscycling - the natural recycling of grass by leaving clippings on the lawn when mowing. Grass clippings willquickly decompose, returning valuable nutrients to the soil. Further information can be obtained at www.calrecycle.ca.gov/organics.

**Use Fertilizers, Herbicides and Pesticides Safely**
Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use of natural, non-toxic alternatives to the traditional fertilizers, herbicides and pesticides is highly recommended. If you must use chemical fertilizers, herbicides, or pesticides:

- Spot apply pesticides and herbicides, rather than blanketing entire areas.
- Avoid applying near curbs and driveways, and never apply before a rain.
- Apply fertilizers as needed, when plants can best use it, and when the potential for it being carried away by runoff is low.

**Recycle Hazardous Waste**
Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility, which accepts these types of materials. For information on proper disposal call, (909) 386-8401.

**Use Water Wisely**
Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads. Plant native vegetation to reduce the need of water, fertilizers, herbicides, and pesticides.

**Prevent Erosion**
Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways.

- Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff.
- Avoid excavation or grading during wet weather.

**Store Materials Safely**
Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials must be covered with plastic sheeting and surrounded with sand bags to protect from rain, wind and runoff.

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

**Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. Fountain water containing chlorine and copperbased algaecides is toxic to aquatic life. Proper inspection, cleaning, and repair of pedestrian areas and HOA owned surfaces and structures can reduce pollutant runoff from these areas. Maintaining these areas may involve one or more of the following activities:**

1. **Surface Cleaning**
2. **Graffiti Cleaning**
3. **Sidewalk Repair**
4. **Controlling Litter**
5. **Fountain Maintenance**

## POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for sidewalk, plaza, and fountain maintenance and cleaning include:

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).
- Once per year, educate HOA staff and tenants on pollution prevention measures.

## MODEL PROCEDURES:

### 1. Surface Cleaning

**Discharges of wash water to the storm water drainage system from cleaning or hosing of impervious surfaces is prohibited.**

**Sidewalks, Plazas**

✓ Use dry methods (e.g. sweeping, backpack blowers, vacuuming) whenever practical to clean sidewalks and plazas rather than hosing, pressure washing, or steam cleaning. DO NOT sweep or blow material into curb; use devices that contain the materials.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

**Parking Areas, Driveways, Drive-thru**

✓ Parking facilities should be swept/vacuumed on a regular basis. Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ Sweep all parking lots at least once before the onset of the wet season.

✓ Use absorbents to pick up oil; then dry sweep.

✓ Appropriately dispose of spilled materials and absorbents.

OPTIONAL:

- Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc.

**Building Surfaces, Decks, etc., without loose paint**

✓ Use high-pressure water, no soap.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

**Unpainted Building Surfaces, Wood Decks, etc.**

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ Use biodegradable cleaning agents to remove deposits.

✓ Make sure pH is between 6.5 and 8.5 THEN discharge to landscaping (if cold water without a cleaning agent) otherwise dispose of properly.

## 2. Graffiti Cleaning

**Graffiti Removal**

✓ Avoid graffiti abatement activities during rain events.

✓ When graffiti is removed by painting over, implement the procedures under Painting and Paint Removal in the Roads, Streets, and Highway Operation and Maintenance procedure sheet.

✓ Protect nearby storm drain inlets prior to removing graffiti from walls, signs, sidewalks, or other structures needing graffiti abatement. Clean up afterwards by sweeping or vacuuming thoroughly, and/or by using absorbent and properly disposing of the absorbent.

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

✓ Note that care should be taken when disposing of waste since it may need to be disposed of as hazardous waste.

OPTIONAL:

• Consider using a waterless and non-toxic chemical cleaning method for graffiti removal (e.g. gels or spray compounds).

## 3. Sidewalk Repair

**Surface Removal and Repair**

✓ Schedule surface removal activities for dry weather if possible.

✓ Avoid creating excess dust when breaking asphalt or concrete.

✓ Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up material.

✓ Designate an area for clean up and proper disposal of excess materials.

✓ Remove and recycle as much of the broken pavement as possible.

✓ When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains shovel or vacuum the slurry, remove from site and dispose of properly.

✓ Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Discharge wash water to landscaping, pump to the sanitary sewer if permitted to do so or contain and dispose of properly.

**Concrete Installation and Repair**

✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

✓ Wash concrete trucks off-site or in designated areas on-site, such that there is no discharge of concrete wash water into storm drain inlets, open ditches, streets, or other storm water conveyance structures. (See Concrete Waste Management BMP WM – 8)

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

- ✓ Store dry and wet concrete materials under cover, protected from rainfall and runoff and away from drainage areas. After job is complete remove temporary stockpiles (asphalt materials, sand, etc.) and other materials as soon as possible.
- ✓ Return leftover materials to the transit mixer. Dispose of small amounts of excess concrete, grout, and mortar in the trash.
- ✓ When washing concrete to remove fine particles and expose the aggregate, contain the wash water for proper disposal.
- ✓ Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stock pile, or dispose in the trash.
- ✓ Protect applications of fresh concrete from rainfall and runoff until the material has hardened.

## 4. Litter Control

- ✓ Enforce anti-litter laws.
- ✓ Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- ✓ Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.

OPTIONAL:

- Post "No Littering" signs.

## 5. Fountain Maintenance

- ✓ Do not use copper-based algaecides. Control algae with chlorine or other alternatives, such as sodium bromide.
- ✓ Allow chlorine to dissipate for a few days and then recycle/reuse water by draining it gradually onto a landscaped area. Water must be tested prior to discharge to ensure that chlorine is not present (concentration must be less than 0.1 ppm).
- ✓ Contact local agency for approval to drain into sewer or storm drain.
- ✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

# EQUIPMENT MAINTENANCE & REPAIR

**Vehicle or equipment maintenance has the potential to be a significant source of stormwater pollution. Engine repair and service (parts cleaning, spilled fuel, oil, etc.), replacement of fluids, and outdoor equipment storage and parking (dripping engines) can all contaminate stormwater. Conducting the following activities in a controlled manner will reduce the potential for stormwater contamination:**

1. **General Maintenance and Repair**
2. **Vehicle and Machine Repair**
3. **Waste Handling/Disposal**

**Related vehicle maintenance activities are covered under the following program headings in this manual: "Vehicle and Equipment Cleaning", "Vehicle and Equipment Storage", and "Vehicle Fueling".**

## POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for equipment maintenance and repair include:

- Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Minimize use of solvents. Clean parts without using solvents whenever possible. Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- Once per year, educate HOA staff and tenants on pollution prevention measures.

# EQUIPMENT MAINTENANCE & REPAIR

## MODEL PROCEDURES:

### 1. General Maintenance and Repair

**General Guidelines**

➔ *Note: Permission must be obtained for any discharge of wash water to the sanitary sewer from the local sewering agency.*

- ✓ Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- ✓ Regularly inspect vehicles and equipment for leaks.
- ✓ Move activity indoors or cover repair area with a permanent roof if feasible.
- ✓ Minimize contact of stormwater with outside operations through berming the local sewering and drainage routing.
- ✓ Place curbs around the immediate boundaries of the process equipment.
- ✓ Clean yard storm drain inlets regularly and stencil them.

**Good Housekeeping**

- ✓ Avoid hosing down work areas. If work areas are washed and if discharge to the sanitary sewer is allowed, treat water with an appropriate treatment device (e.g. clarifier) before discharging. If discharge to the sanitary sewer is not permitted, pump water to a tank and dispose of properly.
- ✓ Collect leaking or dripping fluids in drip pans or container. Fluids are easier to recycle or dispose of properly if kept separate.
- ✓ Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, any discharge of or remove other parts. Place a drip pan under any vehicle that might leak while you work on it to keep splatters or drips off the shop floor.
- ✓ Educate employees on proper handling and disposal of engine fluids.
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- ✓ Post signs at sinks and stencil outdoor storm drain inlets.

### 2. Vehicle Repair

**General Guidelines**

- ✓ Perform vehicle fluid removal or changing inside of a building or in a contained covered area, where feasible, to prevent the run-on of stormwater and the runoff of spills.
- ✓ Regularly inspect vehicles and equipment for leaks, and repair as needed.

- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Immediately drain all fluids from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g. larger pans are needed to contain antifreeze, which may gush from some vehicles).
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- ✓ Oil filters disposed of in trash cans or dumpsters can leak oil. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- ✓ Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling facilities or at County hazardous waste disposal site.

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**Vehicle Leak and Spill Control**

- ✓ Use absorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- ✓ Place a stockpile of spill cleanup materials where it will be readily accessible.
- ✓ Sweep floor using dry absorbent material.

## 3. Machine Repair

- ✓ Keep equipment clean; don't allow excessive build-up of oil or grease.
- ✓ Minimize use of solvents.
- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Perform major equipment repairs at the corporation yard, when practical.
- ✓ Following good housekeeping measures in Vehicle Repair section.

## 4. Waste Handling/Disposal

**Waste Reduction**

- ✓ Prevent spills and drips of solvents and cleansers to the shop floor.
- ✓ Do liquid cleaning at a centralized station so the solvents and residues stay in one area. Recycle liquid cleaners when feasible.

✓ Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

OPTIONAL:

- If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

  -Use non-caustic detergents instead of caustic cleaning for parts cleaning.

  -Use a water-based cleaning service and have tank cleaned. Use detergent-based or water-based cleaning systems in place of organic solvent degreasers.

  -Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.

  -Choose cleaning agents that can be recycled.

**Recycling**

OPTIONAL:

- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.

- Label and track the recycling of waste material (e.g. used oil, spent solvents, batteries).

- Purchase recycled products to support the market for recycled materials.

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## LIMITATIONS:

Space and time limitations may preclude all work being conducted indoors. It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours. Dry floor cleaning methods may not be sufficient for some spills – see spill prevention and control procedures sheet. Identification of engine leaks may require some use of solvents.

# POOL MAINTENANCE

***Pool chemicals and filter solids, when discharged to the City streets, gutters or storm drans, DO NOT GET TREATED before reaching the Santa Ana River. Chlorine, acid cleaning chemicals and metal-based algaecides used in pools can kill beneficial organisms in the food chain and pollute our drinking water.***

**When emptying your swimming pool, spa or fountain, please use one of the following best management practices to prevent water pollution:**

- Reuse the water as landscape irrigation
- Empty the water into the sewer between midnight and 6:00 am
- Remove solids and floating debris and dispose of in the trash, de-chlorinate the water to a chlorine residual = 0, wait 24 hours, then discharge the water to the street or storm drain
- Try not to use metal-based algaecides (i.e. copper sulfate) in your pool or spa. If you have, empty your pool or spa into the sewer. *Prior to discharging pool water into the sanitary sewer system, contact your local agency.*
- If the pool contains algae and mosquito larvae, discharge the water to the sewer

**When acid cleaning or other chemical cleaning:**

- Neutralize the pool water to pH of 6.5 to 8.5, then discharge to the sewer

**For swimming pool and spa filter backwash:**

- Dispose of solids into trash bag, then wash filter into a landscape area
- Settle, dispose of solids in trash and discharge water to the sewer, never to the storm drain

# » For Residents

*The following is a preview of the information we have available to residents. For more fact sheets, visit* ***sbcountystormwater.org***

## Household Hazardous Waste Center Locations

# TOO TOXIC TO TRASH

Dispose of your **HOUSEHOLD HAZARDOUS WASTE** (HHW) at a **FREE** HHW Center near you. Examples of items collected: pesticides, fertilizers, paints, cleaners, antifreeze, batteries, motor oil, oil filters, and electronic waste.

| SERVICE AREA | LOCATION | DAYS OPEN | HOURS |
|---|---|---|---|
| **Big Bear Lake** | 42040 Garstin Dr. (cross: Big Bear Blvd.) | Saturdays | 9 a.m. - 2 p.m. |
| **Chino** | 5050 Schaefer Ave. (cross: 4th St.) | 2nd & 4th Sat. | 8 a.m. - 1 p.m. |
| **Fontana** (Fontana residents only) | 16454 Orange Way (cross: Cypress Ave.) Note: Provide a trash bill and a driver's license as proof of residency. | Saturdays | 8 a.m. - 12 p.m. |
| **Ontario** | 1430 S. Cucamonga Ave. (cross: Belmont St.) | Fri. & Sat. | 9 a.m. - 2 p.m. |
| **Rancho Cucamonga** | 12158 Baseline Rd. (cross: Rochester Ave.) | Saturdays | 8 a.m. - 12 p.m. |
| **Redlands** | 500 Kansas St. (cross: Park Ave.) | Saturdays | 9:30 a.m. - 12:30 p.m. |
| **Rialto** | 246 Willow Ave. (cross: Rialto Ave.) | 2nd & 4th Fri. & Sat. | 8 a.m. - 12 p.m. |
| **San Bernardino** | 2824 East 'W' St., 302 (cross: Victoria Ave.) | Mon. – Fri. | 9 a.m. - 4 p.m. |
| **Upland** (does not accept E-Waste) | 1370 N. Benson Ave. (cross: 14th St.) | Saturdays | 9 a.m. - 2 p.m. |

**sbcounty.gov/stormwater or (800) CLEANUP**

Artwork Courtesy of the City of Los Angeles Stormwater Program. Printed on recycled paper.



# WE DID IT OURSELVES AND WE DID IT RIGHT

When painting your home, protect your family and community.

- **PAINTS** that are water-based are less toxic and should be used whenever possible.
- **BRUSHES** with water-based paint should be washed in the sink. Those with oil-based paint should be cleaned with paint thinner.
- **SAFELY** dispose of unwanted paint and paint thinner. The County of San Bernardino offers 9 HHW Centers that accept paint and other household hazardous waste from residents FREE of charge. For a list of acceptable materials, location information, and hours of operation call 1-800-OILY CAT.

# VEHICLE MAINTENANCE

Oil, grease, anti-freeze and other toxic automotive fluids often make their way into the San Bernardino County storm drain system, and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.

**Cleaning Auto Parts**
Scrape parts with a wire brush or use a bake oven rather than liquid cleaners. Arrange drip pans, drying racks and drain boards so that fluids are directed back into the parts washer or the fluid holding tank. Do not wash parts or equipment in a sink, parking lot, driveway or street.

**Storing Hazardous Waste**
Keep your liquid waste segregated. Many fluids can be recycled via hazardous waste disposal companies if they are not mixed. Store all materials under cover with spill containment or inside to prevent contamination of rainwater runoff.

**Preventing Leaks and Spills**
Conduct all vehicle maintenance inside of a garage. Place drip pans underneath vehicle to capture fluids. Use absorbent materials instead of water to clean work areas.

**Cleaning Spills**
Use dry methods for spill cleanup (sweeping, absorbent materials). To report accidental spills into the street or storm drain call (877) WASTE18 or 911.

**Proper Disposal of Hazardous Waste**
Dispose of household hazardous waste by taking it to your nearest household hazardous waste center. For more information, call 1-800-OILY CAT or check out sbcountystormwater.org/Disposal.html

# PET WASTE DISPOSAL

# FREE

## DOGGIE WASTE BAGS

Remember to pick up after your pet every time to keep San Bernardino County clean and healthy!




In the event of a spill or discharge to a storm drain or waterway, contact San Bernadino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

**sbcountystormwater.org**

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# » Get In Touch With Us Online!

**» Website**
*sbcountystormwater.org*

**» eUpdates**
*sbcountystormwater.org/newsletter*

**» Facebook**
*facebook.com/sbcountystormwater*

**» YouTube**
*youtube.com/sbcountystormwater*



**» Report Pollution Violations**
*sbcountystormwater.org/report*

**» Email**
*info@sbcountystormwater.org*

## Regulatory information

The Federal Water Pollution Control Act prohibits the discharge of any pollutant to navigable waters from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 passage of the Water Quality Act established NPDES permit requirements for discharges of storm water. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

Industrial facilities and construction sites are regulated by the Regional Water Quality Control Board and State Water Resources Control Board, through general storm water permits. Most industrial, manufacturing or transportation businesses that store materials, products or equipment outdoors, or conduct vehicle washing or process operations outdoors are required to obtain coverage under the State Water Resources Control Board's General Industrial Activities Stormwater Permit. For more information about this permit, visit www.swrcb.ca.gov/stormwtr/industrial.html or contact your local storm water coordinator.

If your business conducts construction activities, including clearing, grading, stockpiling or excavation that results in soil disturbances of at least one acre, you are subject to the State Water Resources Control Board's General Construction Activities Stormwater Permit. To find out more about this storm water permit for construction, visit: www.swrcb.ca.gov/stormwtr/construction.html.

Cities and counties are regulated through permits issued by the Regional Boards. Since 1990, operators of large storm drain systems such as San Bernardino County's have been required to:

- Develop a storm water management program designed to prevent harmful pollutants from being dumped or washed by storm water runoff, into the storm water system, then discharged into local water bodies; and
- Obtain a National Pollutant Discharge Elimination System (NPDES) permit.

The NPDES permit programs in California are administered by the State Water Resources Control Board and by nine regional boards that issue NPDES permits and enforce regulations within their respective region.

San Bernardino County lies within the jurisdiction of the Santa Ana Region. This regional board issues a permit to the San Bernardino County Permittees, which includes the County of San Bernardino, San Bernardino County Flood Control District and incorporated cities of San Bernardino County. Since the program's inception, the County of San Bernardino has served as the principal permittee.

SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION



## Documents & reports:

The following documents describe the regulations and programs for water quality in San Bernardino County. You can review the latest Basin Plan, National Pollutant Discharge Elimination System (NPDES) Permit and Drainage Area Management Plan (DAMP).

- **Basin Plans:** The document for each region of the State Water Quality Board's jurisdiction, including Santa Ana, is the Water Quality Control Plan, commonly referred to as the Basin Plan. It is the foundation for the regulatory programs of each regional board. The Basin Plan documents the beneficial uses of the region's ground and surface waters, existing water quality conditions, problems, and goals, and actions by the regional board and others that are necessary to achieve and maintain water quality standards.

▶Water Control Plan for the Santa Ana River Basin

- **Municipal National Pollutant Discharge Elimination System (NPDES) Permits:** The permits of each region outline additional steps for a storm water management program and specify requirements to help protect the beneficial uses of the receiving waters. They require permittees to develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States to the maximum extent practicable (MEP).

  ▶Santa Ana Regional Water Quality Control Board Municipal NPDES Permit Order No. R8-2002-0012

- **Report of Waste Discharge:** The Report of Waste Discharge (ROWD) describes the San Bernardino Stormwater Program, implemented by the County and cities to comply with their jointly held stormwater permit. It is the principle policy and guidance document for the NPDES Stormwater Program.

  ▶Report of Waste Discharge 2000

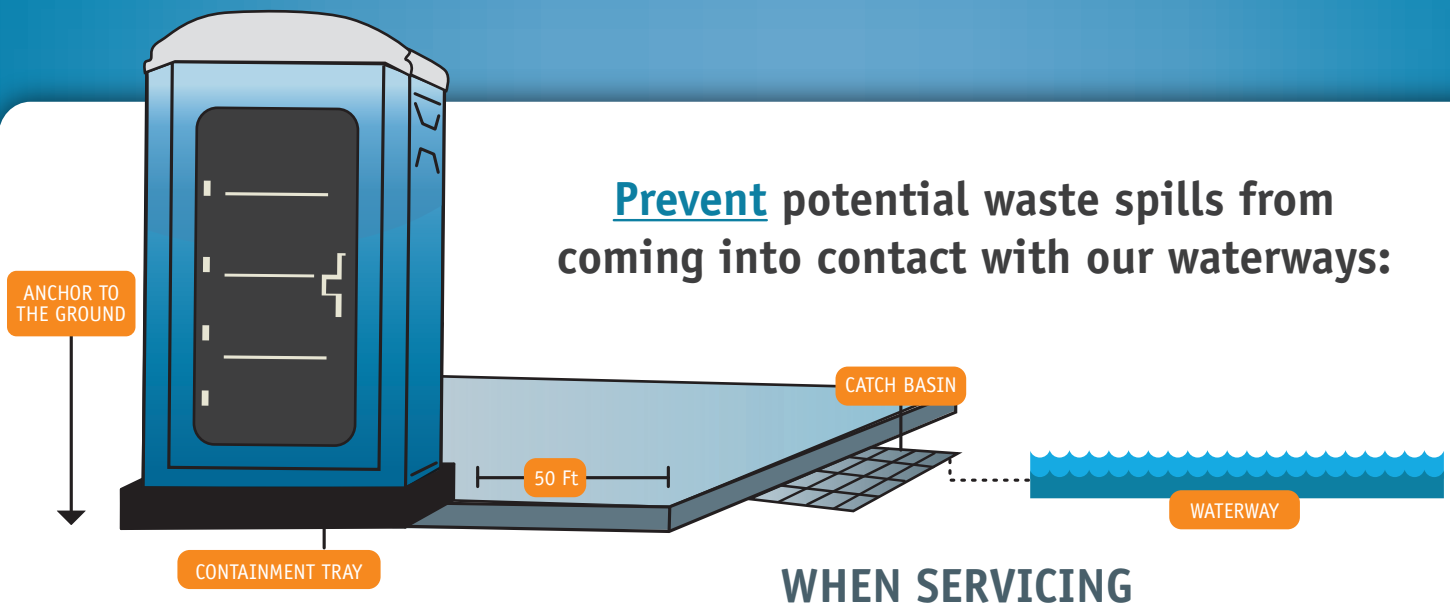
- **San Bernardino County Storm Water Program Annual Status Report:** The Annual Status Report is a requirement of the NPDES permit for submittal to the Regional Boards and United States Environmental Protection Agency. The report presents an analysis and assessment of permit compliance activities.

▶Annual report - will be posted soon

**For more information about how you can prevent stormwater pollution:**

**www.sbcountystormwater.org**

# PORTABLE TOILET BUSINESSES




## Prevent potential waste spills from coming into contact with our waterways:

## WHEN DELIVERING

- ✓ Site Portable Toilets at least 50 feet away from a catch basin or waterway.
- ✓ In high wind areas, secure the Portable Toilets by anchoring the unit securely to the ground.
- ✓ Equip Portable Toilets with a containment tray to prevent accidental overflow.

When there is potential for greater than normal usage, **remind** your clients to **request additional units** or **adjust the service schedule** to ensure sanitary conditions and **prevent overflow**.

## WHEN SERVICING

- ✓ On the service vehicle:
  - Maintain the condition of all hoses, couplings, tanks, and equipment to prevent leaks or spills.
  - Properly store and handle potential contaminants (Portable Toilet waste, disinfectants, oils,detergents etc.) to prevent any spills or discharges from entering the street, gutter or catch basin.
- ✓ When rinsing or washing Portable Toilets, ensure that all waste water is captured in the containment tray to prevent waste water from entering the street, gutter or catch basin.
- ✓ Upon completion of the cleaning process, pump the captured water into the service vehicle.

## WHAT IS STORMWATER POLLUTION?

Stormwater pollution is created when bacteria, organic matter, disinfectants, and suspended solids are transported by water or wind into the catch basins and storm drain system. The untreated urban runoff then flows directly into our lakes and rivers contaminating our communities with high levels of bacteria, posing a threat to public health and wildlife.

**THANK YOU FOR BEING A RESPONSIBLE BUSINESS AND HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!**

In the event of a spill or discharge to a storm drain or waterway, contact San Bernardino County Stormwater immediately: **(877) WASTE18** | **sbcountystormwater.org/report**
To dispose of hazardous waste call the San Bernardino County Fire Dept. - CUPA Program **(909) 386-8401**

**sbcountystormwater.org**

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# NEGOCIOS DE BAÑOS PORTÁTILES




## Impida que los derrames potenciales de desechos entren en contacto con nuestras vías fluviales:

### AL MOMENTO DE LA ENTREGA

- ✓ Coloque los Baños Portátiles a una distancia mínima de 50 pies de un sumidero o vía fluvial.
- ✓ En áreas de vientos fuertes, proteja los Baños Portátiles anclando la unidad en forma segura al suelo.
- ✓ Coloque la bandeja de contencion abajo del Baño Portatil.

Cuando exista la posibilidad de un uso mayor de lo normal, **recuerde** a sus clientes **que soliciten unidades adicionales o que adapten el programa de mantenimiento** para garantizar las condiciones sanitarias y **prevenir desbordes.**

### CUANDO SE REALIZE EL MANTENIMIENTO

- ✓ En el vehículo de servicio:
  - Mantenga en condiciones óptimas todas las mangueras acoples, tanques y equipo a fin de prevenir derrames.
  - Almacene y maneje en forma apropiada los contaminantes potenciales (desechos del Baño Portátil, desinfectantes, aceites, detergentes, etc) para impedir cualquier derrame o que se produzcan descargas hacia la calle, la alcantarilla o el sumidero.
- ✓ Al enjuagar o lavar los Baños Portátiles, asegúrese de que la bandeja de contención capture toda el agua residual, para impedir que ésta llegue a la calle, alcantarilla o sumidero.
- ✓ Al completar el proceso de limpieza, bombee el agua capturada en el vehículo de servicio.

## ¿QUÉ ES LA CONTAMINACIÓN DE AGUAS PLUVIALES?

La contaminación de aguas pluviales se crea cuando el agua o el viento transportan bacterias, materia orgánica, desinfectantes y sólidos suspendidos hacia los sumideros y el sistema de drenaje pluvial. Los residuos líquidos urbanos sin tratar luego fluyen directamente hacia los lagos y ríos contaminando nuestras comunidades con altos niveles de bacterias y plantean una amenaza para la salud pública y la vida silvestre.

## GRACIAS POR SER UN NEGOCIO RESPONSABLE Y AYUDAR A MANTENER LIMPIO Y SALUDABLE EL CONDADO DE SAN BERNARDINO.

En caso de un derrame o descarga en un drenaje pluvial o vía fluvial, comuníquese de inmediato con San Bernardino County Stormwater: **(877) WASTE18 | sbcountystormwater.org/report**
Para deshacerse de los residuos peligrosos llame al Condado de San Bernardino Departamento de Bomberos - programa CUPA **(909) 386-8401**

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# SAN BERNARDINO COUNTY
## STORMWATER POLLUTION PREVENTION

### General industrial & manufacturing businesses:

If you own, manage or help operate a business, especially an industrial or manufacturing company, you can help reduce storm water pollution. From environmentally friendly cleaning and maintenance activities, to recycling hazardous waste materials, businesses can do a lot to prevent storm water pollution.

- Review your cleaning and maintenance activities to look for ways to reduce runoff into the storm drain system, especially in outdoor areas like parking lots, loading docks and maintenance yards. Keep trash enclosure swept and trash bin lids closed.
- Train employees to wash vehicles and equipment indoors in a wash rack that is connected to the sanitary sewer or off-site at a commercial wash facility. Train janitorial staff to dispose of floor cleaning water in the sewer and not into the parking lot. Make sure that cooling towers, boilers, compressors, water softeners and other process equipment are connected to the sanitary sewer and do not discharge wastewater into the parking lot.
- If you use hazardous materials in your everyday business, like ink and solvents for commercial printing, or polishes and chemicals for car detailing or manufacturing after-market accessories, do not put these hazardous materials in the trash or pour them into the gutter. Take them to be recycled safely. Store chemicals, wastes, raw materials and contaminated equipment indoors or in a covered, spill contained area, to prevent exposure of these materials to storm water. For information on proper hazardous waste disposal, call (909)386-8401.
- Take advantage of less-toxic alternatives to dangerous chemicals. From detergents to drain openers, there are a lot of ways to get the same or better result without having to rely toxic substances.
- Looking for raw materials? San Bernardino County Materials Exchange Program, or SBCoMax is a partnership between the County and the California Integrated Waste Management Board, for businesses to provide used but usable materials to those interested in obtaining them. The program helps divert used materials from landfills, saves resources and can save you money.

**For more information about how you can prevent stormwater pollution:**

**www.sbcountystormwater.org**

# STORMWATER Pollution Prevention

## Important Phone Numbers

**San Bernardino County Flood Control**
(909) 387-8112

**County of San Bernardino**
(909) 387-8109

**City of Big Bear Lake**
(909) 866-5831

**City of Chino** (909) 591-9850

**City of Chino Hills** (909) 364-2722

**City of Colton** (909) 370-6128

**City of Fontana** (909) 350-6772

**City of Grand Terrace**
(909) 824-6671 x 226

**City of Highland** (909) 864-8732 x 230

**City of Loma Linda** (909) 799-4405

**City of Montclair** (909) 625-9470

**City of Ontario** (909) 395-2025

**City of Rancho Cucamonga**
(909) 477-2740 x 4063

**City of Redlands** (909) 798-7655

**City of Rialto** (909) 421-4921

**City of San Bernardino** (909) 384-5154

**City of Upland** (909) 931-4370

**City of Yucaipa** (909) 797-2489 x 243

**San Bernardino County**
**Stormwater Program**
825 East Third Street • Room 201
San Bernardino, CA 94215-0835

# STORMWATER Pollution Prevention

## INDUSTRIAL AND COMMERCIAL FACILITIES



# STORMWATER Pollution Prevention

To reduce the amount of pollutants reaching our storm drain system, which leads to the Santa Ana River and Pacific Ocean, the San Bernardino County Stormwater Program has developed Best Management Practices (BMPs) for Industrial and Commercial Facilities. City and County ordinances require that businesses comply with these BMPs, where applicable, to protect local water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.




**Prohibited Discharges**

- Discontinue all non-stormwater discharges to the storm drain system. It is prohibited to discharge any chemicals, wastes or wastewater into the gutter, street or storm drain.

**Outdoor Storage**

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, except when in direct use.
- Sweep outdoor areas instead of using a hose or pressure washer.

**Outdoor Processes**

- Move all process operations including vehicle and equipment maintenance inside of the building or into a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to city standards, then discharged to a sanitary sewer or take them to a commercial car wash.

**Spills and Clean Ups**

- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials and followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors, vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the County Fire Department at (909) 386-8401.

# Industrial and Commercial Facilities

- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator either at (800) CLEANUP or as listed at www.sbcounty.gov/stormwater.
- Report hazardous materials spills to (800) 33 TOXIC and your local Fire Department Hazmat Team at 911.

**Training**

Train employees in spill response procedures and prohibited discharges to the storm drain system, as prescribed in your local Stormwater Ordinance and in applicable Best Management Practices available at www.cabmphandbooks.com and www. sbcounty.gov/stormwater.

**Permitting**

Stormwater discharges associated with specific categories of commercial and industrial facilities are regulated by the State Water Resources Control Board (SWRCB) through an Industrial Storm Water General Permit. A copy of the General Permit and application forms are available at: www.waterboards.ca.gov/stormwtr/industrial.html

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

or visit our websites at:

**www.sbcounty.gov/stormwater**

**www.1800cleanup.org**

San Bernardino County STORMWATER PROGRAM

# Prevención de Contaminación
## AL SISTEMA DE DRENAJE

### Números de Teléfono Importantes

**San Bernardino County Flood Control**
(909) 387-8112

**County of San Bernardino**
(909) 387-8109

**City of Big Bear Lake**
(909) 866-5831

**City of Chino** (909) 591-9850

**City of Chino Hills** (909) 364-2722

**City of Colton** (909) 370-6128

**City of Fontana** (909) 350-6772

**City of Grand Terrace**
(909) 824-6671 x 226

**City of Highland** (909) 864-8732 x 230

**City of Loma Linda** (909) 799-4405

**City of Montclair** (909) 625-9470

**City of Ontario** (909) 395-2025

**City of Rancho Cucamonga**
(909) 477-2740 x 4063

**City of Redlands** (909) 798-7655

**City of Rialto** (909) 421-4921

**City of San Bernardino** (909) 384-5154

**City of Upland** (909) 931-4370

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**Stormwater Program**
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# Prevención de Contaminación
## AL SISTEMA DE DRENAJE

### INSTALACIONES INDUSTRIALES Y COMERCIALES



# Prevención de Contaminación
## AL SISTEMA DE DRENAJE

Para reducir la cantidad de contaminantes que alcanzan nuestro sistema de aguas pluviales, las cuales desembocan en el Río Santa Ana y el Océano Pacífico, el Programa del Condado de San Bernandino ha desarrollado las pautas de Mejores Prácticas de Manejo (BMPs, por sus siglas en inglés) para instalaciones industriales y comerciales. Los decretos de la ciudad y del condado establecen que todas las empresas deben de cumplir con estas BMPs, cuando corresponda, para proteger la calidad del agua local. Las ciudades locales y el condado tienen la obligación de verificar la implementación de estas BMPs al llevar a cabo inspecciones regulares en sus instalaciones.




**Desagües Prohibidos**

- Descontinúe todo desagüe de aguas no pluviales al sistema de drenaje de aguas pluviales. Está prohibido descargar cualquier sustancia química, residuo o agua residual a los drenajes de la cuneta, de la calle o de aguas pluviales.

**Almacenamiento al Aire Libre**

- Instale cubiertas y áreas de retención secundarias para todos los materiales peligrosos y residuos almacenados al aire libre, estas instalaciones deberán de cumplir con los estándares establecidos por el condado y/o la ciudad.
- Mantenga todos los recipientes temporales de residuos cubiertos, con la excepción de cuando se estén utilizando directamente.
- Barra todas las áreas al aire libre en lugar de usar una manguera o un equipo de limpieza con agua a alta presión.

**Procesos al Aire Libre**

- Reubique todos los procesos u operaciones, incluyendo el mantenimiento de vehículos y equipo, dentro de un edificio en una área cubierta e independiente.
- Lave el equipo y los vehículos en una fosa de lavado independiente que tenga un anillo cerrado o bien, esté conectada a un clarificador del tamaño de los estándares municipales, luego elimine los residuos en un drenaje sanitario o llévelos a un lavador de carros comercial.

**Derrames y Limpieza**

- Limpie los derrames inmediatamente, utilice métodos de limpieza en seco como son el uso de materiales absorbentes y elimine estos materiales de la manera adecuada.
- Siempre tenga a la mano un estuche para derrames cerca de las puertas de los muelles de carga de sustancias químicas, en las áreas de mantenimiento de vehículos y en las áreas de combustible.
- Siga su Plan de Emergencia Comercial, como lo registró con el Departamento de Bomberos del Condado marcando al (909) 386-8401.
- Reporte todos los desagües prohibidos y cualquier punto no implementado de las BMPs a su coordinador local de Aguas Pluviales llamando al (800) CLEANUP o como se indica en el enlace www.sbcounty.gov/stormwater.
- Reporte cualquier derrame peligroso al (800) 33 TOXIC y al equipo Hazmat de su departamento local de bomberos marcando al 911.

# Instalaciones Industriales y Comerciales

**Capacitación**

Capacite a los empleados sobre los procedimientos de respuesta ante un derrame y los desagües prohibidos al sistema de aguas pluviales, como lo indica el decreto local de aguas pluviales de Mejores Prácticas de Manejo (BMPs) disponibles en el sitio www.cabmphandbooks.com y www.sbcounty.gov/stormwater.

**Autoridad Competente**

Los desagües de aguas pluviales relacionados con categorías específicas de instalaciones comerciales e industriales están regulados por la Junta Estatal de Control de Recursos Acuáticos (State Water Resources Control Board, SWRCB) a través de un permiso industrial general de aguas pluviales. Para obtener una copia de este permiso general y una solicitud, visite el sitio: www.waterboards.ca.gov/stormwtr/industrial.html

Para reportar el desagüe de residuos ilegales o para obtener información adicional sobre la prevención de contaminación a las aguas pluviales, llame a:

## 1 (800) CLEANUP

o visite nuestro sitio:

**www.sbcounty.gov/stormwater**

**www.1800cleanup.org**

San Bernardino County STORMWATER PROGRAM

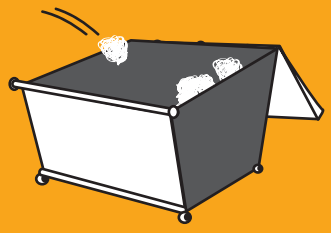
# COMMERCIAL TRASH ENCLOSURES

## FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

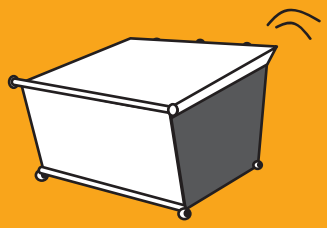
## PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

### PUT TRASH INSIDE



Place trash inside the bin (preferably in sealed bags)

### CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

### KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

## SOME ADDITIONAL GUIDELINES, INCLUDE

### ✓ SWEEP FREQUENTLY

Sweep trash enclosure areas frequently, instead of hosing them down, to prevent polluted water from flowing into the streets and storm drains.

### ✓ FIX LEAKS

Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

### ✓ CONSTRUCT ROOF

Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

**THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!**

San Bernardino County STORMWATER PROGRAM

To report illegal dumping **(877-WASTE18)** or
to find a household hazardous waste facility (800-OILY CAT): **sbcountystormwater.org**
To dispose of hazardous waste call the San Bernardino County Fire Dept. - CUPA Program **(909) 386-8401**

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Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

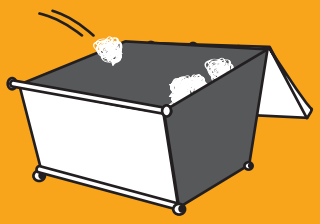
# CONTENEDORES COMERCIALES PARA LA BASURA

## SIGA ESTOS **PASOS** PARA MANTENER **LIMPIAS NUESTRAS VÍAS FLUVIALES**

Los contenedores de basura, tales como aquellos que se encuentran en las unidades comerciales y departamentos, generalmente contienen materiales que están destinados a los rellenos sanitarios o en algún establecimiento de reciclaje.
**Estos materiales NO deben ser vertidos en nuestros lagos y ríos locales.**

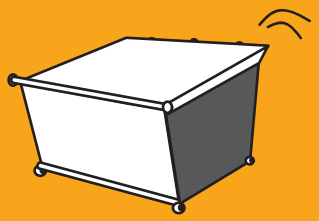
## SIGA ESTOS PASOS PARA PROTEGER LA CALIDAD DEL AGUA

### COLOQUE LA BASURA ADENTRO



Coloque la basura adentro del contenedor (preferentemente en bolsas selladas)

### CIERRE LA TAPA



Evite que la lluvia ingrese al contenedor para evitar un escape de escorrentía contaminada

### MANTENGA LOS PRODUCTOS TÓXICOS AFUERA



- Pintura
- Lubricante, grasas y aceites usados
- Baterías, componentes electrónicos y luces fluorescentes

## ALGUNAS GUÍAS ADICIONALES, LAS CUALES INCLUYEN

### ✓ BARRER CON FRECUENCIA

Barra con frecuencia las áreas de los recintos para la basura, en lugar de lavarlas con una manguera, para evitar que el agua contaminada se vierta en las calles y los desagües de lluvia.

### ✓ REPARE LAS GOTERAS

Ocúpese inmediatamente de las goteras en los contenedores de basura. Use los métodos de limpieza en seco e infórmele a su recolector de basura para que reciba un reemplazo.

### ✓ CONSTRUYA UN TECHO

Construya un techo de cubierta sólida sobre la estructura actual del recinto para la basura a fin de evitar que el agua de lluvia entre en contacto con los desechos y la basura. Consulte con su Ciudad/Condado para conocer los Códigos de Construcción.

En el Condado de San Bernardino, los desechos de alimentos y jardines, los productos químicos y otros restos que se vierten en los desagües de aguas pluviales y que terminan en nuestras vías fluviales sin tratamiento alguno provocan la contaminación de estas aguas. Usted puede ser parte de la solución si mantiene un recinto para la basura que no contamine el agua.

**¡MUCHAS GRACIAS POR AYUDAR A MANTENER EL CONDADO DE SB LIMPIO Y SIN CONTAMINACIÓN!**

San Bernardino County STORMWATER PROGRAM

Para informar acerca del vertedero ilegal, llame a **(877-WASTE18)**, o para encontrar un establecimiento donde arrojar los residuos peligrosos del hogar, llame a **(800-OILY CAT)**: **sbcountystormwater.org**
Para deshacerse de los residuos peligrosos llame al Condado de San Bernardino Departamento de Bomberos - programa CUPA **(909) 386-8401**

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Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

# *APPENDIX D*

# *SOILS REPORT*

# GEOTECHNICAL AND INFILTRATION EVALUATION
# FOR
# PROPOSED SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
# ASSESSOR'S PARCEL NUMBERS (APNS) 1045-121-02 & 1045-151-34
# UPLAND COLONIES 59
# NORTH OF EAST 15TH STREET
# UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA

**PREPARED FOR**

**FRONTIER ENTERPRISES**
**2151 EAST CONVENTION CENTER WAY, SUITE 100**
**ONTARIO, CALIFORNIA 91764**

**PREPARED BY**

**GEOTEK, INC.**
**1548 NORTH MAPLE STREET**
**CORONA, CALIFORNIA 92880**

**PROJECT NO. 1925-CR** **JULY 12, 2018**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92880
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

July 12, 2018
Project No. 1925-CR

**Frontier Enterprises**
2151 East Convention Center Way, Suite 100
Ontario, California 91764

Attention: Mr. Daniel Pocius

Subject: Geotechnical and Infiltration Evaluation
Proposed Single-Family Residential Development
Assessor's Parcel Numbers (APNs) 1045-121-02 & 1045-151-34
Upland Colonies 59
Upland, San Bernardino County, California

Dear Mr. Pocius:

We are pleased to provide the results of our geotechnical evaluation for the subject property located in Upland, San Bernardino County, California. This report presents a discussion of our evaluation and provides preliminary geotechnical recommendations for earthwork, foundation design, and construction.

In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations presented in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service is sincerely appreciated. If you have any questions, please do not hesitate to call our office.

Respectfully submitted,
**GeoTek, Inc.**







Robert R. Russell
GE 2042, Exp. 12/31/18
Senior Project Engineer

Edward H. LaMont
CEG 1892, Exp. 07/31/20
Principal Geologist

Anna M. Scott
Project Geologist

Distribution: (1) Addressee via email (one PDF file)

*G:\Projects\1901 to 1950\1925CR Frontier Enterprises APNs 1045-121-02 and 1045-151-34 Upland\Geotechnical and Infiltration Evaluation\1925CR Geotechnical and Infiltration Evaluation Upland.doc*

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ENCLOSURES

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Figure 2 – Trench Location Map

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Appendix B – Laboratory Testing Results
Appendix C – Infiltration Test Data
Appendix D – General Earthwork Grading Guidelines

# 1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical conditions for the proposed improvements. Services provided for this study included the following:

- Research and review of available geologic data and general information pertinent to the site,
- A site reconnaissance,
- Excavation of eight exploratory trenches on-site,
- Infiltration testing in two shallow exploratory trenches on-site,
- Collection of soil samples of the on-site materials,
- Laboratory testing of selected soil samples collected from the site,
- Review and evaluation of site seismicity, and;
- Compilation of this geotechnical report which presents our preliminary recommendations for site development.

The intent of this report is to aid in the evaluation of the site for future proposed development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report will likely need to be updated based upon our review of the final site development plans. These plans should be provided to GeoTek, Inc. (GeoTek) for review when available.

# 2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

## 2.1 SITE DESCRIPTION

The site is located north of East 15$^{th}$ Street in the city of Upland. The irregular-shaped site is approximately 9.16 acres in size. The site is currently vacant land with no visual indication of previous structural improvements. However, based on a review of aerial photography, the site appears to be part of a storm water basin.

The site is in an area largely residentially developed. The site is bounded by an existing golf course to the north, residential developments to the south and west and vacant land and the golf course to the east and northeast. An electrical substation is located further to the west.

Based on information provided to us by the client, it is our understanding the proposed improvements include a single-family residential development consisting of 57 residential building pads, several storm water basins and associated roadways.

Specific structural loading was not provided to us. Therefore, this report has been prepared based on the proposed residential structures will be of wood-frame construction, two-stories and less and incorporate a concrete slab-on-grade floor.

Based on topographic information provided, the elevation of the site ranges from about El. 1413 within the bottom of the existing basin to about El. 1430 along the top of the ascending slopes. The existing slopes appear to be inclined at ratios of about 3:1 (horizontal:vertical). Although proposed site grades have not been provided, we anticipate that the existing basin will be filled so that the new buildings will be close to adjacent development site grades. Accordingly, we anticipate cuts and fills up to about 15 feet in thickness.

If site development differs from the information presented in this report, the recommendations should be subject to further review and evaluation by GeoTek. Final site development plans should be reviewed by GeoTek when they become available.

# 3. FIELD EXPLORATION AND LABORATORY TESTING

## 3.1 FIELD EXPLORATION

Our geotechnical field exploration was conducted on June 28, 2018. A geologist from GeoTek logged eight exploratory test trenches excavated with a backhoe. The trenches were located within the vicinity of the proposed improvements (see Trench Location Map, Figure 2). Logs of the exploratory trenches are included in Appendix A. Samples of on-site soils encountered in the excavations were returned to the laboratory for testing and evaluation.

## 3.2 INFILTRATION TEST INFORMATION

Two test trenches (T-4 and T-8) were excavated to a depth of approximately four feet below the existing ground surface within proposed storm water retention/basin areas as directed to us by the project civil engineer, Proactive Engineering Consultants. A 11-inch diameter test hole was then excavated at the base of the test trench to a depth of about 12 inches. The test holes were then filled with water to pre-soak the test hole. Following pre-soaking, the test holes were filled with water and the drop in water level as the water percolated into the underlying soil was recorded every 6 or 30 minutes. The test was continued for a minimum of twelve readings and the final reading was used in the calculation of the infiltration rate. The field data was converted to an infiltration rate via the Porchet method.

The infiltration rates are presented in the follow table for each of the borings after the rates had stabilized.

| Test No. | Infiltration Rate (inches per hour) |
|---|---|
| T-4 | 20.9 |
| T-8 | 3.48 |

Copies of the percolation data sheets and infiltration conversion sheets (Porchet Method) are included in Appendix C.

Over the lifetime of the storm water disposal areas, the infiltration rates may be affected by silt build up and biological activities, as well as local variations in near surface soil conditions. We recommend that an appropriate factor of safety be applied.

## 3.3 LABORATORY TESTING

Laboratory testing was performed on selected bulk soil samples collected during our field exploration. The purpose of the laboratory testing was to confirm the field classification of the soils encountered and to evaluate their physical properties for use in the engineering design and analysis. Laboratory testing has included expansion index and corrosion potential (pH, resistivity, chloride and sulfate content). Results of the laboratory testing program along with a brief description and relevant information regarding testing procedures are included in Appendix B or on the exploratory logs included in Appendix A.

# 4. GEOLOGIC AND SOILS CONDITIONS

## 4.1 REGIONAL SETTING

The property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles from the north and northeasterly adjacent the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

More specific to the property, the is located in an area geologically mapped to be underlain by alluvial fan deposits (Morton, D.M. and Miller F.K., 2006).

## 4.2 GENERAL SOIL/GEOLOGIC CONDITIONS

A brief description of the earth materials encountered at the subject site is presented in the following sections. Based on our field exploration and observations, the site is generally underlain by undocumented fill and alluvium.

### 4.2.1 Undocumented Fill

Undocumented fill was encountered within five of the test trenches to depths ranging from about 2.5 to 6.5+ feet below grade. The undocumented fill encountered consisted of a silty gravelly sand to a silty sand with some cobbles and/or boulders. Trace brick and tile fragments were also observed in the fill within one of the test excavations.

### 4.2.2 Alluvium

Alluvium was encountered at existing grade and/or below the undocumented fill. In general, the alluvial materials encountered typically consist of silty sand, sand and sandy gravel with variable cobble content.

According to the results of the laboratory testing performed, the near-surface alluvial soils exhibited a "very low" expansion potential when tested in accordance with ASTM D 4829. The test results are provided in Appendix B.

## 4.3 SURFACE AND GROUNDWATER

### 4.3.1 Surface Water

Surface water was not observed on the site during our subsurface exploration. If encountered during the earthwork construction, surface water on this site is the result of precipitation. Overall site area drainage is generally by sheet flow in a northerly direction. Provisions for surface drainage will need to be accounted for by the project civil engineer.

### 4.3.2 Groundwater

Groundwater was not encountered in our exploratory excavations. Based on a review of information contained in the State Water Resources Control Board database (http://www.water.ca.gov/waterdatalibrary/) groundwater is estimated to be greater than 100 feet below ground surface.

Based on the results of our field exploration, review of site area geomorphology and geology, groundwater is not anticipated to adversely affect the proposed improvements.

## 4.4 FAULTING AND SEISMICITY

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is presently known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone. The nearest mapped active faults are the Sierra Madre fault, located about 2.6 miles to the north and the Red Hill-Etiwanda fault located about 5.3 miles to the northeast.

Based on a review of the *San Bernardino County Geologic Hazard Overlays* (Sheet FH 27C), the site is not located within a designated fault hazard, liquefaction hazard or landslide hazard area.

### 4.4.1 Seismic Design Parameters

The site is located at approximately 34.1184° Latitude and -117.6332° Longitude. Site spectral accelerations (Ss and $S_1$), for 0.2 and 1.0 second periods for a Class "D" site, were determined from the USGS Website, Earthquake Hazards Program, U.S. Seismic Design Maps for Risk-Targeted Maximum Considered Earthquake ($MCE_R$) Ground Motion Response Accelerations

for the Conterminous 48 States by Latitude/Longitude. The results are presented in the following table:

| SITE SEISMIC PARAMETERS | |
|---|---|
| Mapped 0.2 sec Period Spectral Acceleration, $S_S$ | 1.786g |
| Mapped 1.0 sec Period Spectral Acceleration, $S_1$ | 0.629g |
| Site Coefficient for Site Class "D", $F_a$ | 1.0 |
| Site Coefficient for Site Class "D", $F_v$ | 1.5 |
| Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$ | 1.786g |
| Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$ | 0.944g |
| 5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{DS}$ | 1.190g |
| 5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$ | 0.629g |

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

## 4.5 LIQUEFACTION AND SEISMICALLY-INDUCED SETTLEMENT

Based on a review of the San Bernardino County Geologic Hazard Overlay Map (FH 27C-Ontario), the site is not located within a designated liquefaction hazard zone. A review of the groundwater contours noted on the map by Carson and Matti (Carson and Matti, 1985), the depth to groundwater is greater than 200 feet below grade. Groundwater data (http://www.water.ca.gov/waterdatalibrary/) also suggests that groundwater is at a depth greater than 100 feet below existing grade.

Liquefaction is not considered to be a hazard at the subject site due to the great depth to groundwater (greater than 50 feet) and the current geologic hazard mapping.

## 4.6 OTHER SEISMIC HAZARDS

The site is not mapped within a zone of generalized landslide susceptibility per the California Geological Survey. Evidence of ancient landslides or slope instabilities at this site was not observed during our investigation. Thus, the potential for landslides is considered negligible for design purposes.

The potential for secondary seismic hazards such as a seiche or tsunami is considered negligible due to site elevation and distance to an open body of water.

# 5. CONCLUSIONS AND RECOMMENDATIONS

## 5.1 GENERAL

The anticipated site development appears feasible from a geotechnical viewpoint provided that the following recommendations, and those provided by this firm at a later date, are properly incorporated into the design and construction phases of development. Site development and grading plans should be reviewed by GeoTek when they become available.

## 5.2 EARTHWORK CONSIDERATIONS

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Upland, the 2016 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix D outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix D.

### 5.2.1 Site Clearing and Demolition

In areas of planned grading and improvements, the site should be cleared of vegetation, roots, and debris. These materials should be properly disposed of off-site. Voids resulting from site clearing should be replaced with engineered fill materials with expansion characteristics similar to the on-site soils.

### 5.2.2 Removals

Due to the presence of undocumented fill and the disturbed nature of the exposed alluvium, we recommend that the existing soils be removed to a depth of at least four feet below existing or finish grade, whichever is deeper. In areas where fill is exposed at the base of the over-excavation, the exposed fill soils should be examined by a GeoTek representative to determine if additional removals are warranted.

A minimum of three feet of engineered fill should be provided below the bottom of the proposed footings. The horizontal extent of removals should extend at least eight feet outside the perimeter footings and floor-slabs, or a distance equal to the depth of over-excavation below the bottom of the structural elements, whichever is greater.

#### 5.2.2.1 Pavement and Hardscape Areas

A minimum of 12 inches of engineered fill should be provided below asphaltic concrete pavement and Portland cement concrete hardscape areas. The horizontal extent of removals should extend at least two feet beyond the edge.

#### 5.2.2.2 Preparation of Areas to Receive Engineered Fill

A representative of this firm should observe the bottom of all excavations. Upon approval, the exposed soils and all soils in areas to receive engineered fill should be scarified to a depth of approximately 12 inches, moistened to slightly over the optimum moisture content and compacted to a minimum relative compaction of 90 percent (ASTM D 1557).

### 5.2.3 Engineered Fills

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation, debris and other deleterious material. Due to the presence of cobbles and boulders, some sorting of over-sized materials (+6 inches) is also expected to be necessary.

The undercut areas should be brought to the final subgrade elevations with fill materials that are placed in eight inch or less loose lifts, moisture conditioned to at least the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM Test Method D 1557. The upper one foot of pavement subgrade should be compacted to 95 percent (ASTM D 1557).

### 5.2.4 Excavation Characteristics

Excavation in the on-site soils is expected to be feasible utilizing heavy-duty grading equipment in good operating condition. All temporary excavations for grading purposes and installation of underground utilities should be constructed in accordance with local and Cal-OSHA guidelines. Temporary excavations within the on-site materials should be stable at 1:1 (horizontal:vertical) inclinations for cuts less than four feet in height. Some excavation difficulties could result due to the presence of cobbles and boulders.

### 5.2.5 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage is primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of approximately 5 to 15 percent may be considered for the materials requiring removal and/or recompaction. Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction. Subsidence on the order of 0.1 to 0.2 feet may occur.

## 5.3 DESIGN RECOMMENDATIONS

### 5.3.1 Foundation Design Criteria

The soils tested within our laboratory indicated the site soils possess a "very low" ($0 \leq EI \leq 20$) expansion potential in accordance with ASTM D 4829. Foundation design criteria, in general conformance with the 2016 CBC, are presented below. Typical design criteria for the site based upon a "very low" expansion potential are tabulated below. These are minimal recommendations and are not intended to supersede the design by the project structural engineer.

The foundation elements for the proposed structures should bear entirely in engineered fill soils. Foundations should be designed in accordance with the *2016 California Building Code* (CBC).

Expansion index and soluble sulfate testing of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

A summary of our foundation design recommendations is presented in the following table:

**GEOTECHNICAL RECOMMENDATIONS FOR FOUNDATION DESIGN**

| Design Parameter | "Very Low" Expansion Potential 0≤EI≤20 |
|---|---|
| Foundation Depth or Minimum Perimeter Beam Depth (inches below the lowest adjacent grade) | One-Story – 12<br>Two-Stories – 18 |
| Minimum Foundation Width (inches)* | One- to Two-Stories – 12 |
| Minimum Slab Thickness (inches) | 4 - Actual |
| Sand Blanket and Moisture Retardant membrane below On-Grade Building Slabs | 2 inches of sand** overlying moisture vapor retardant membrane overlying 2 inches of sand** |
| Minimum Slab Reinforcing | 6" x 6" – W1.4/W1.4 welded wire fabric placed in the middle of slab |
| Minimum Footing Reinforcement for Continuous Footings, Grade Beams and Retaining Wall Footings | Two No. 4 reinforcing bars, one placed near the top and one near the bottom |
| Presaturation of Subgrade Soil (Percent of Optimum/Depth in Inches) | Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete |

* Code minimums per Table 1809.7 of the 2016 CBC
** Sand should have a sand equivalent of at least 30

An allowable bearing capacity of 2,000 pounds per square foot (psf) may be used for design of building and retaining wall footings. This value may be increased by 300 psf for each additional 12 inches of embedment depth and by 200 psf for each additional 12 inches in width to a maximum of 3,000 psf. The allowable bearing capacity may be increased by one-third when considering short-term wind and/or seismic loads.

For footings designed in accordance with the recommendations presented in this report, we would anticipate a maximum static settlement of less than one inch and a maximum differential static settlement of less than ½-inch in a 40-foot span. We recommend that the structural engineer evaluate the seismic-induced settlement and determine the impact on the proposed improvements.

The passive earth pressure may be computed as an equivalent fluid having a density of 300 psf per foot of depth, to a maximum earth pressure of 3,000 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.40 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in calculating passive pressure. When combining passive and frictional resistance, the passive pressure component should be reduced by one-third.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2013 California Green Building Standards Code (CALGreen) Section 4.505.2 and the 2013 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also

meet the requirements of ASTM E1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a six-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual possessing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, and/or architect be consulted to evaluate the general and specific moisture vapor transmission paths and associated potential impact.

In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we along with geotechnical consultants in general, do not practice in areas of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

### 5.3.2 Miscellaneous Foundation Recommendations

- To reduce moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.
- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.
- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

### 5.3.3 Foundation Set Backs

Minimum setbacks for all foundations should comply with the 2016 CBC or City of Upland requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements.

The bottom of any proposed foundations should be deepened so as to extend below a 1:1 upward projection from the bottom edge of the nearest excavation and the bottom edge of the closest footing.

### 5.3.4 Retaining and Garden Wall Design and Construction

#### 5.3.4.1 General Design Criteria

Recommendations presented in this report apply to typical masonry or concrete vertical retaining walls to a maximum height of up to six feet. Additional review and recommendations should be requested for higher walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be embedded a minimum of 12 inches into engineered fill. Retaining wall foundations should be designed in accordance with Section 5.3.1 of this report. Structural needs may govern and should be evaluated by the project structural engineer.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

Earthwork considerations, site clearing and remedial earthwork for all earth retention structures should meet the requirements of this report, unless specifically provided otherwise, or more stringent requirements or recommendations are made by the designer. The backfill material placement for all earth retention structures should meet the requirement of Section 5.3.4.3 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the earth retention structure, may be designed using the active condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the at-rest condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (h:v) projection from the surcharge on the stem of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

#### 5.3.4.2 Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to six feet high. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

| ACTIVE EARTH PRESSURES | |
|---|---|
| Surface Slope of Retained Materials (h:v) | Equivalent Fluid Pressure (pcf) Select Backfill* and Native Soils |
| Level | 30 |
| 2:1 | 45 |

* The design pressures assume the backfill material has an expansion index less than or equal to 20. Backfill zone includes area between back of the wall to a plane (1:1 h:v) up from bottom of the wall foundation (on the backside of the wall) to the ground surface.

### 5.3.4.3 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one-foot wide section of ¾- to one-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The upper 24 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision to the parameters provided and modification of the wall designs. The backfill materials should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D 1557. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, Miradrain 2000 or approved equivalent may be used behind the retaining wall. The Miradrain 2000 should extend from the base of the wall to within two feet of the ground surface. The subdrain should be placed in direct contact with the Miradrain 2000.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. Backdrains should consist of a four-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one cubic foot per linear foot of ¾- to one-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

#### 5.3.4.4 Restrained Retaining Walls

Retaining walls that will be restrained at the top that support level backfill or that have reentrant or male corners, should be designed for an equivalent at-rest fluid pressure of 55 pcf, plus any applicable surcharge loading. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

#### 5.3.4.5 Other Design Considerations

- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

### 5.3.5 Soil Corrosivity

The soil resistivity at this site was tested in the laboratory on one sample collected during the field investigation. The results of the testing indicate that the on-site soils (resistivity = 65,660 ohm-cm) are considered "progressively less corrosive" to buried ferrous metal in accordance with current standards used by corrosion engineers. We recommend that a corrosion engineer be consulted to provide recommendations for the protection of buried ferrous metal at this site.

### 5.3.6 Soil Sulfate Content

The sulfate content was determined in the laboratory for one on-site soil samples. The results indicate that the water-soluble sulfate result is less than 0.1 percent by weight, which is considered "not applicable" (negligible) as per Table 4.2.1 of ACI 318.

### 5.3.7 Import Soils

Import soils should have expansion characteristics similar to the on-site soils (EI<20). GeoTek also recommends that the proposed import soils be tested for expansion and corrosivity potential. GeoTek should be notified a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

### 5.3.8 Concrete Flatwork

#### 5.3.8.1 Exterior Concrete Slabs, Sidewalks and Driveways

Exterior concrete slabs, sidewalks and driveways should be designed using a four-inch minimum thickness. No specific reinforcement is required from a geotechnical perspective. However, some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in residential construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.

Subgrade soils (typically "very low" expansion potential) should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs, sidewalks, driveways, etc. at the subject site should be pre-saturated to a minimum of 100 percent of optimum moisture content to a depth of at least 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with City of Upland specifications, and under the observation and testing of GeoTek and a City/County inspector, if necessary.

#### 5.3.8.2 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 0.125-inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks, some cracking will occur despite the best efforts to minimize it. Concrete can also undergo chemical processes that are dependent upon a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

Exterior concrete flatwork (patios, walkways, driveways, etc.) is often some of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. We suggest that the same standards of care be applied to these features as to the structures themselves.

## 5.4 POST CONSTRUCTION CONSIDERATIONS

### 5.4.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. Care should be taken when adding soil amendments to avoid excessive watering. An abatement program to control ground-burrowing rodents should be implemented and maintained since they can decrease the long-term performance of slopes.

It is common for planting to be placed adjacent to the structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided.

### 5.4.2 Drainage

Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings. Soil areas within 10 feet of the proposed structures should slope at a minimum of five percent away from the building, if possible, unless the area is paved. Paved areas are to be sloped two percent away from the structure. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

### 5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

We recommend that specifications and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. We also recommend that GeoTek representatives be present during site grading and foundation construction to observe and document proper implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trench backfill. Also, perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.
- Observe retaining wall backdrain.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. We recommend that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

## 6. INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our evaluation is limited to the boundaries of the subject property. This review does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by the client. Further, no evaluation of any

existing site improvements is included. The scope is based on our understanding of the project and the client's needs, our fee estimate (Proposal No. P-0602818) dated June 11, 2018 and geotechnical engineering standards normally used on similar projects in this locality at the present.

## 7. LIMITATIONS

Our findings are based on site conditions observed and the stated sources. GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Our recommendations are based on the site conditions observed and encountered and laboratory testing. Our conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

## 8. SELECTED REFERENCES

American Concrete Institute (ACI), 2006, Publication 302.2R-06, Guide for Concrete Slabs That Receive Moisture Sensitive Flooring Materials.

_____, 2010, Publications 360R-10, Guide to Design of Slabs-On-Ground.

American Society of Civil Engineers (ASCE), 2013, "Minimum Design Loads for Buildings and Other Structures," ASCE/SEI 7-10, Third Printing, Errata Incorporated through March 15.

California Code of Regulations, Title 24, 2016, "California Building Code," 3 volumes.

Carson, S. E. and Matti, J. C., 1985, "Contour Map Showing Minimum Depth to Groundwater, Upper Santa Anan River Valley, California, 1973-1979", USGS Map MF-1802.

Dibblee, T.W. and Minch, J.A., 2002, "Geologic Map of the San Dimas and Ontario Quadrangles, Los Angeles and San Bernardino Counties, California," Dibblee Geological Foundation, Dibblee Foundation Map DF-91, scale 1:24,000.

GeoTek, Inc., In-house proprietary information.

National Association of Corrosion Engineers, 1984, "Corrosion Basics, An Introduction".

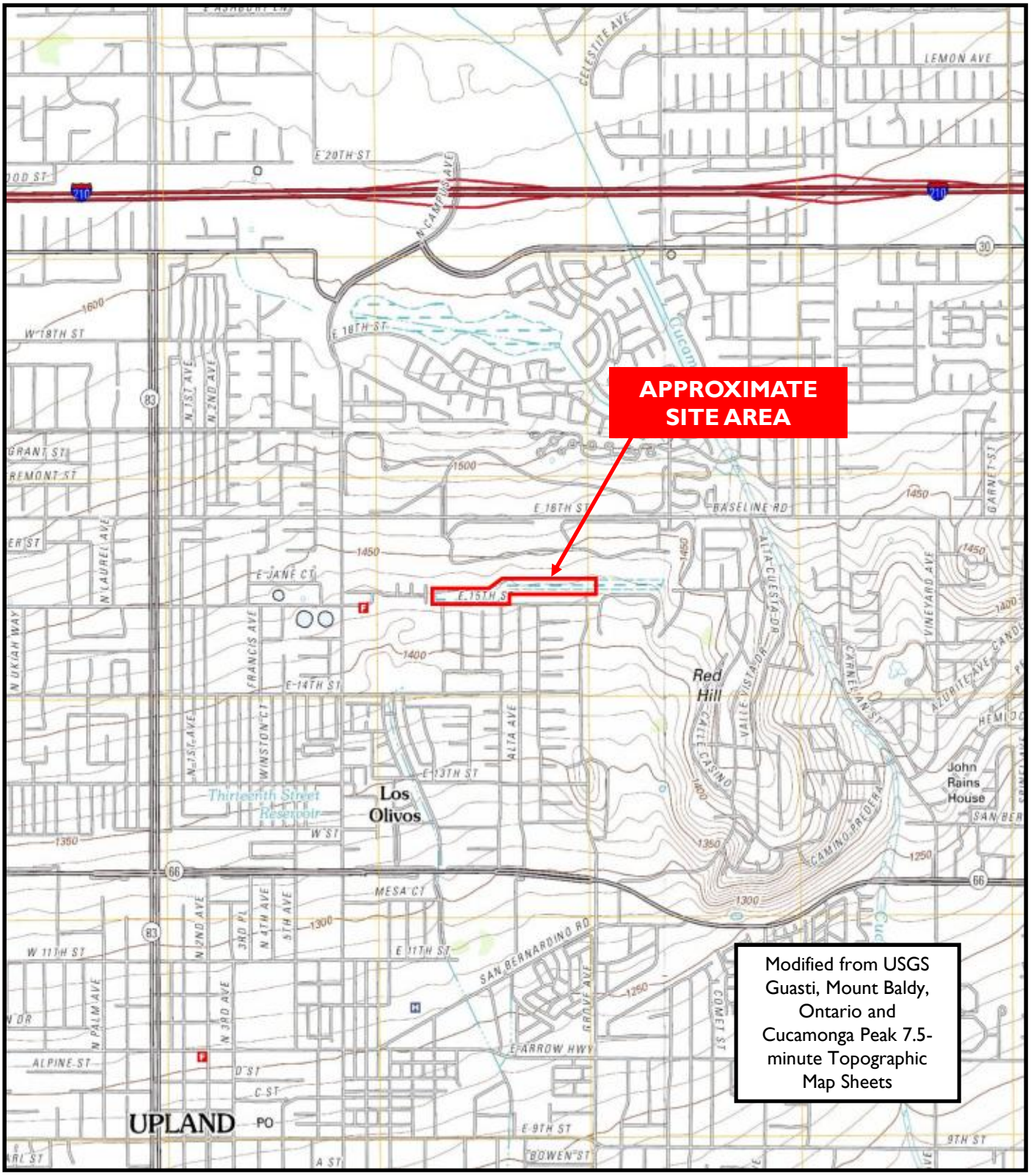
Peck, R. B., Hanson, W. E. and Thornburn, T. H., 1974, "Foundation Engineering", Second Edition.

San Bernardino County Land Use Services Geologic Hazard Maps (http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/GeologicHazardMaps.aspx)

Seismic Design Values for Buildings (http://geohazards.usgs.gov/designmaps/us/application.php).

Terzaghi, K. and Peck, R. B., 1967, "Soil Mechanics in Engineering Practice", Second Edition.

The County of San Bernardino Areawide Stormwater Program, Technical Guidance Document (TGD) for Water Quality Management Plans, Appendix VII., Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations, with an effective date of September 19, 2013.




Modified from USGS Guasti, Mount Baldy, Ontario and Cucamonga Peak 7.5-minute Topographic Map Sheets

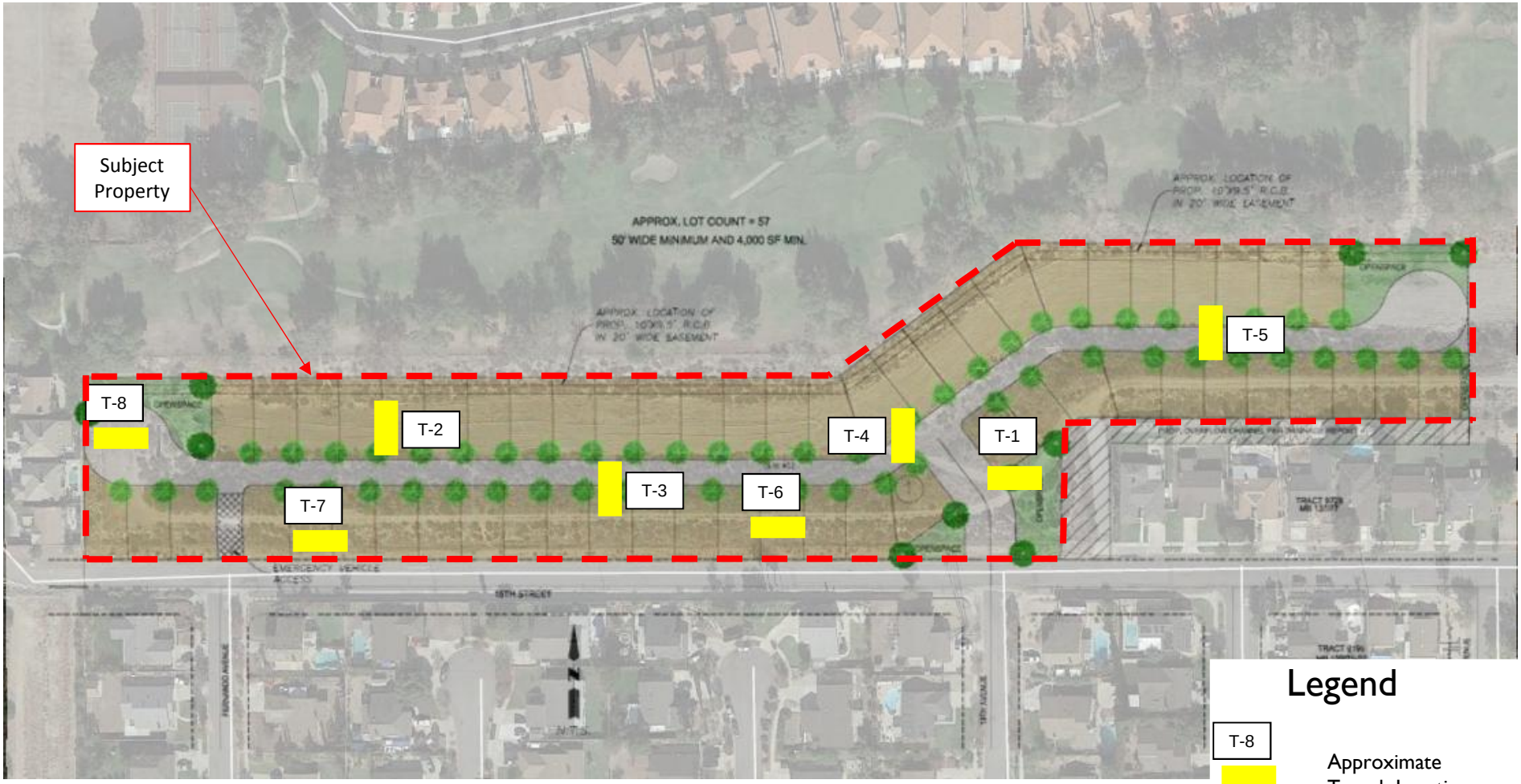
**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

Project No. 1925-CR

NORTH

**Figure 1**
**Site Location and General Site Topography Map**

GEOTEK




**Frontier Enterprises**
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California
GeoTek Project No. 1925-CR

NORTH

Figure 2

Trench Location Map

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# APPENDIX A

## LOGS OF EXPLORATORY TRENCHES

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

GEOTEK

## A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the log of boring. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

## B – TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of trenches:

*SOILS*

| | |
|---|---|
| USCS | Unified Soil Classification System |
| f-c | Fine to coarse |
| f-m | Fine to medium |

*GEOLOGIC*

| | |
|---|---|
| B: Attitudes | Bedding: strike/dip |
| J: Attitudes | Joint: strike/dip |
| C: Contact line | |
| …….. | Dashed line denotes USCS material change |
| ——— | Solid Line denotes unit / formational change |
| ——— | Thick solid line denotes end of the trench |

(Additional denotations and symbols are provided on the log of trenches)

## GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-1 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **UNDOCUMENTED ARTIFICIAL FILL** | | | |
| | | | SM | Silty gravelly f-c SAND, light brown, dry, some boulders up to 24", some roots | | | |
| | | | SP | Gravelly f-c SAND, gray, dry, some cobbles, rare boulders up to 18" | | | |
| 5 | | | | Cobble Silty f-c SAND, gray, dry | | | |
| | | | | **TRENCH TERMINATED AT 6.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-2 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | X | | SM | **ALLUVIUM**<br>Silty gravelly f-c SAND, gray, dry, some cobbles, some roots | | | EI, SR |
| | | | GP | F-c sandy GRAVEL, brownish gray, slightly moist, few cobbles<br>6" thick bed of gravel dipping same angle of slope | | | |
| | | | SP | F-c SAND, gray, dry | | | |
| 5 | | | GP | Silty f-c sandy GRAVEL, gray, slightly moist, some cobbles | | | |
| | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-3 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SM | **UNDOCUMENTED ARTIFICIAL FILL**<br>Silty f-c SAND, gray, dry, some gravel, few cobbles, some roots | | | |
| 5 | | | SP | **ALLUVIUM**<br>Gravelly f-c SAND, grayish brown, slightly moist, few cobbles, one large boulder up to 24"<br><br>Same as above, trace rootlets | | | |
| 10 | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-4 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **ALLUVIUM** | | | |
| | | | SP | Gravelly f-c SAND, brownish gray, dry, some cobbles | | | |
| | | | | Same as above, trace boulders 16-20", becomes slightly moist | | | |
| | | | SP | M-c SAND, gray, slightly moist | | | |
| 5 | | | | **TRENCH TERMINATED AT 4 FEET** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-5 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **ALLUVIUM** | | | |
| | | | SP | Gravelly f-c SAND, gray, dry, some cobble, some roots, trace boulders 12-18" | | | |
| | | | | One 24" boulder, trace oxidized staining | | | |
| | | | | Gravelly f-c SAND, grayish brown, slightly moist, trace rootlets | | | |
| 5 | | | | More cobbles become apparent | | | |
| | | | | **TRENCH TERMINATED AT 6.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

**GeoTek, Inc.**

# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-6 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | | **UNDOCUMENTED ARTIFICIAL FILL** | | | |
| | X | | SM | Silty f-c SAND, grayish brown, dry, some gravel, some cobble, some rootlets | | | EI |
| 5 | | | | Silty f-c SAND, grayish brown, slightly moist, some gravel, some cobble, trace boulders up to 14" | | | |
| | | | SP | Gravelly f-c SAND, grayish brown, slightly moist, some cobble, trace boulders up to 16" | | | |
| | | | | **TRENCH TERMINATED AT 7.5 FEET (REFUSAL)** | | | |
| | | | | No groundwater | | | |
| | | | | Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring; ---Large Bulk; ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-7 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SM | **UNDOCUMENTED ARTIFICIAL FILL**<br>Silty f-c SAND, brownish gray, dry, some gravel, few cobbles, some roots | | | |
| | | | SP | F-c SAND, brown, slightly moist to moist, some gravel, trace cobble, few rootlets | | | |
| 5 | | | | Same as above, no rootlets | | | |
| | | | | **TRENCH TERMINATED AT 6 FEET (REFUSAL)**<br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# GeoTek, Inc.
# LOG OF EXPLORATORY TRENCH

| | | | |
|---|---|---|---|
| **CLIENT:** | Frontier Enterprises | **LOGGED BY:** | DRW |
| **PROJECT NAME:** | Upland Basin | **EQUIPMENT** | Backhoe |
| **PROJECT NO.:** | 1925-CR | **DATE:** | 6/28/2018 |
| **LOCATION:** | See Exploration Location Map | | |

| Depth (ft) | SAMPLES: Sample Type | SAMPLES: Blow Count | USCS Symbol | TRENCH NO.: T-8 / MATERIAL DESCRIPTION AND COMMENTS | Laboratory Testing: Water Content (%) | Laboratory Testing: Dry Density (pcf) | Laboratory Testing: Others |
|---|---|---|---|---|---|---|---|
| | | | SP | **UNDOCUMENTED ARTIFICIAL FILL**<br>F-c SAND, grayish brown, dry, some gravel, trace brick and tile | | | |
| | | | SM | Silty f-c SAND, brown, slightly moist to moist, some gravel, trace cobble, rare plastic material | | | |
| | | | SP | **ALLUVIUM**<br>M-c SAND, gray, slightly moist | | | |
| 5 | | | | **TRENCH TERMINATED AT 4 FEET**<br><br>No groundwater<br>Backfilled with excavated soils | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |

LEGEND

**Sample type**: ---Ring ---Large Bulk ---Water Table

**Lab testing:** AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resistivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

# APPENDIX B

## LABORATORY TESTING RESULTS

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

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# SUMMARY OF LABORATORY TESTING

## Classification

Soils were classified visually in general accordance to the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the log of trenches in Appendix A.

## Expansion Index

Expansion Index testing was performed on one representative soil sample. Testing was performed in general accordance with ASTM Test Method D 4829. The results of the testing are provided below.

| Boring No. | Depth (ft.) | Description | Expansion Index | Classification |
|---|---|---|---|---|
| T-2 | 0-2 | Silty Sand | 0 | Very Low |
| T-6 | 1-3 | Silty Sand | 0 | Very Low |

## Sulfate Content, Resistivity and Chloride Content

Testing to determine the water-soluble sulfate content was performed by Project X Corrosion Engineering in general accordance with ASTM D516. Resistivity testing was completed by others in general accordance with ASTM G187. Testing to determine the chloride content was performed by others in general accordance with ASTM D 512B. The results of the testing are provided below.

| Boring No. | Depth (ft.) | pH ASTM G51 | Chloride ASTM D512B (mg/kg)) | Sulfate ASTM D516 (% by weight) | Resistivity ASTM G187 (ohm-cm) |
|---|---|---|---|---|---|
| T-2 | 0-2 | 7.36 | 6 | 0.0030 | 65,660 |

# APPENDIX C

## INFILTRATION TEST DATA

**APNs 1045-121-02 & 1045-151-34**
**Upland, San Bernardino County, California**
**Project No. 1925-CR**

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## PERCOLATION DATA SHEET

FRONTIER ENTERPRISES

Project: E 15TH ST. AT 13TH AVENUE, Job No.: 1925-CR.

Test Hole No.: EAST T-4 Tested By: DVG, Date: 6/28/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PREWATER 5 GAL |
| | 113 | | 12 | 12 | | | | BEGIN |
| | 116 | 3 | | | 5½ | 6½ | | 1ST 25 MIN. |
| | 118 | | 12 | 12 | | | | |
| | 122 | 4 | | | 6 | 6 | | 2ND 25 MIN. |
| | 124 | | 12 | 12 | | | | |
| | 130 | 6 | | | 4 | 8 | | 1ST 6 MIN. |
| | 132 | | 12 | 12 | | | | |
| | 138 | 6 | | | 4 | 8 | | 2ND 6 MIN. |
| | 140 | | 12 | 12 | | | | |
| | 146 | 6 | | | 4 | 8 | | 3RD 6 MIN. |
| | 148 | | 12 | 12 | | | | |
| | 154 | 6 | | | 4 | 8 | | 4TH 6 MIN. |
| | 156 | | 12 | 12 | | | | |
| | 202 | 6 | | | 4 | 8 | | 5TH 6 MIN. |
| | 204 | | 12 | 12 | | | | |
| | 210 | 6 | | | 4 | 8 | | 6TH 6 MIN. |
| | 212 | | 12 | 12 | | | | |
| | 218 | 6 | | | 4 | 8 | | 7TH 6 MIN. |

11" DIAMETER TEST HOLE

12" DEEP

60" TRENCH DEPTH

## PERCOLATION DATA SHEET

Project: _____, Job No.: _____.

Test Hole No.: T-4 Tested By: _____, Date: _____.

Depth of Hole As Drilled: _____ Before Test: _____ After Test: _____.

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | 220 | | 12 | 12 | | | | |
| | 226 | 6 | | | 4 | 8 | | 8TH 6 MIN. |
| | 228 | | 12 | 12 | | | | |
| | 234 | 6 | | | 4 1/4 | 7 3/4 | | 9TH 6 MIN. |
| | 236 | | 12 | 12 | | | | |
| | 242 | 6 | | | 4 1/4 | 7 3/4 | | 10TH 6 MIN. |
| | 244 | | 12 | 12 | | | | |
| | 250 | 6 | | | 4 1/4 | 7 3/4 | | 11TH 6 MIN. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

FRONTIER ENTERPRISES
E. 15TH ST AT 13TH AVENUE

# PERCOLATION DATA SHEET

Project: _____, Job No.: 1925-CIR.

Test Hole No.: WEST T-8 Tested By: DVG, Date: 6/29/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PREWATER 5 GAL |
| | 715 | | 12 | 12 | | | | BEGIN |
| | 740 | 25 | | | 5 1/2 | 6 1/2 | | 1ST 25 MIN. |
| | 742 | | 12 | 12 | | | | |
| | 807 | 25 | | | 5 1/2 | 6 1/2 | | 2ND 25 MIN. |
| | 809 | | 12 | 12 | | | | |
| | 839 | 30 | | | 5 | 7 | | 1ST 30 MIN. |
| | 841 | | 12 | 12 | | | | |
| | 911 | 30 | | | 5 | 7 | | 2ND 30 MIN |
| | 913 | | 12 | 12 | | | | |
| | 943 | 30 | | | 5 | 7 | | 3RD 30 MIN |
| | 945 | | 12 | 12 | | | | |
| | 1015 | 30 | | | 5 | 7 | | 4TH 30 MIN |
| | 1017 | | 12 | 12 | | | | |
| | 1047 | 30 | | | 5 | 7 | | 5TH 30 MIN |
| | 1049 | | 12 | 12 | | | | |
| | 1119 | 30 | | | 5 | 7 | | 6TH 30 MIN |
| | 1121 | | 12 | 12 | | | | |
| | 1151 | 30 | | | 5 | 7 | | 7TH 30 MIN |

11" DIAMETER TEST HOLE

12" DEEP

60" TRENCH DEPTH

## PERCOLATION DATA SHEET

Project: _____, Job No.: 1925-CR.

Test Hole No.: WEST T-8 Tested By: DVG, Date: 6/29/2018.

Depth of Hole As Drilled: 12" Before Test: 12" After Test: 12".

| Reading No. | Time | Time Interval (Min) | Total Depth of Hole (Inches) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ In Water Level (Inches) | Rate (minutes per inch) | Comments |
|---|---|---|---|---|---|---|---|---|
| | 1153 | | 12 | 12 | | | | |
| | 1223 | 30 | | | 5 | 7 | | 8TH 30 MIN. |
| | 1225 | | 12 | 12 | | | | |
| | 1255 | 30 | | | 5 | 7 | | 9TH 30 MIN. |
| | 1257 | | 12 | 12 | | | | |
| | 127 | 30 | | | 5 | 7 | | 10TH 30 MIN |
| | 129 | | 12 | 12 | | | | |
| | 159 | 30 | | | 5 | 7 | | 11TH 30 MIN |
| | 201 | | 12 | 12 | | | | |
| | 231 | 30 | | | 5 1/4 | 6 3/4 | | 12TH 30 MIN |
| | 233 | | 12 | 12 | | | | |
| | 303 | 30 | | | 5 1/4 | 6 3/4 | | 13TH 30 MIN |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | |
|---|---|
| **Client:** | **Frontier Enterprises** |
| **Project:** | **Upland** |
| **Project No:** | **1925-CR** |
| **Date:** | **6/28/2018** |

**Trench No.** **T-4**

## Percolation Rate (Porchet Method)

| | |
|---|---|
| Time Interval, $\Delta t$ = | 6 |
| Final Depth to Water, $D_F$ = | 7.75 |
| Test Hole Radius, r = | 5.5 |
| Initial Depth to Water, $D_O$ = | 0 |
| Total Test Hole Depth, $D_T$ = | 12 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 12 |
| $H_F = D_T - D_F$ = | 4.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 7.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 8.125 |

**$I_t$ =** 19.60 **Inches per Hour**

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| | |
|---|---|
| **Client:** | **Frontier Enterprises** |
| **Project:** | **Upland** |
| **Project No:** | **1925-CR** |
| **Date:** | **6/29/2018** |

**Trench No.** **T-8**

## Percolation Rate (Porchet Method)

| | |
|---|---|
| Time Interval, $\Delta t$ = | 30 |
| Final Depth to Water, $D_F$ = | 6.75 |
| Test Hole Radius, r = | 5.5 |
| Initial Depth to Water, $D_O$ = | 0 |
| Total Test Hole Depth, $D_T$ = | 12 |

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

| | |
|---|---|
| $H_O = D_T - D_O$ = | 12 |
| $H_F = D_T - D_F$ = | 5.25 |
| $\Delta H = \Delta D = H_O - H_F$ = | 6.75 |
| $H_{avg} = (H_O+H_F)/2$ = | 8.625 |

**$I_t$ =** 3.26 **Inches per Hour**

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# APPENDIX D

## GENERAL EARTHWORK GRADING GUIDELINES

**APNs 1045-121-02 & 1045-151-34**

**Upland, San Bernardino County, California**

**Project No. 1925-CR**

GEOTEK

# GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

## General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the Uniform Building Code, CBC (2016) and the guidelines presented below.

## Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

## Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.

5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
    a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
    b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

## Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

## Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.

2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

**Fill Placement**

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
   a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
   b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
   a) They are not placed in concentrated pockets;
   b) There is a sufficient percentage of fine-grained material to surround the rocks;
   c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable

methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

### Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

## UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.

2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

## JOB SAFETY

### General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

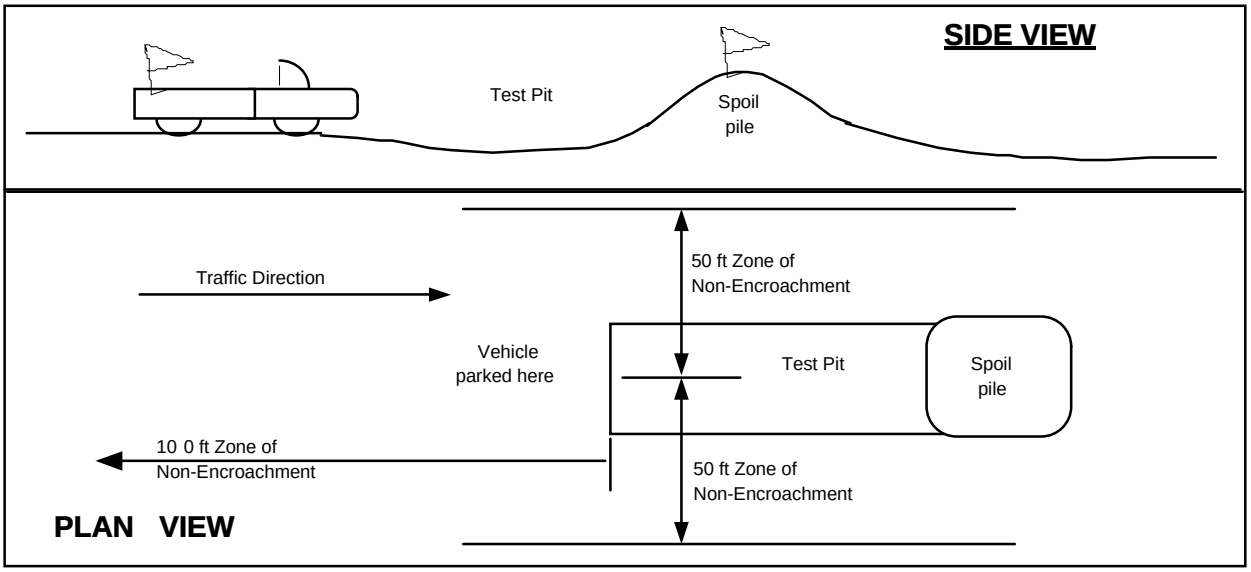
### Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

**TEST PIT SAFETY PLAN**



### Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

### Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

### Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor’s representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project

manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

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# APPENDIX G3:

# 15TH STREET BASIN MODIFICATIONS REVIEW AND RECOMMENDATIONS

# TECHNICAL MEMORANDUM

**To:** City of Upland

JN 10.031.002

**From:** John McCarthy, PE

**Date:** June 29, 2018, Revised July 31, 2018

**Subject:** 15th Street Basin Modifications Review and Recommendations

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Q3 Consulting (Q3) was contracted by Frontier Communities to review the "Drainage Study in the City of Upland for the 15th Street Basin" report prepared by Madole & Associates, Inc., dated June 12, 2017. The purpose of the review was to validate the findings in the report and identify recommendations to address any concerns or issues identified in the report.

The Madole Report provides the conceptual basis of design for the modification of the existing 15th Street Basin to allow for residential development on the westerly portion of the basin. In general, the report provides the hydrology and hydraulic calculations to document the ability of the reduced size of the 15th Street Basin to provide the required peak flow mitigation consistent with the existing conditions. The proposed improvements reduce the overall area of the existing basin, but provide the required storage volume by increasing the depth of ponding in the basin. In the existing condition the basin ponds to an elevation of 1422.6' during a 100-year storm event. In the proposed condition the basin would pond to an elevation of 1427'. This increased depth allows for a similar peak runoff volume to be stored in the basin (61.93 acre-feet in the existing condition and 62.90 acre-feet in the proposed condition) and provided the required peak flow rate mitigation. The report also looked at the impacts associated with re-routing the inflow and discharge lines from the new basin location.

The Madole Report updated the hydrology tributary to the basin and prepared new flood routing calculations for the proposed configuration of the basin. Detailed hydraulics analysis was prepared for the downstream drainage system. The results of the analysis were compared to the existing conditions to document that the project would not adversely affect the downstream or upstream drainage systems.

***Hydrology***

The Rational Method hydrology tributary to the basin was updated from an LD King study completed in 2000. The updated hydrology used the NOAA Atlas 14 rainfall data and latest City land use plan. The results of the Rational Method were used to prepare an updated Unit Hydrograph analysis. The study calculated revised loss rates in accordance with San Bernardino County Hydrology Manual procedures. A flood routing analysis was prepared to combine the hydrographs and route the combined flow through the proposed detention basin. No comments were identified on the hydrology, except that the unit

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hydrograph time step for the subarea from Node 9 to Node 81 used a value of 10 minutes. The other hydrographs used a time step of 5 minutes which is more appropriate for the lag times of the subarea hydrographs.

The time step should be revised to 5 minutes with any updates to the calculations.

***Basin Size and Storage Capacity Evaluation***

The volume of water stored in the basin is 62.9 acre-feet in the project condition. The State Division of Safety of Dams (DSOD) takes jurisdiction of basins over 50 acre-feet in size. Facilities over this size are classified as dams and have much higher design standards and maintenance/inspection requirements. There are exceptions to this rule if the spillway of the basin (considered the maximum water surface elevation that can pond in the basin) is less than 6-feet above the downstream toe of the basin embankment. See chart in Figure 1 for the jurisdictional sizing criteria.

In reviewing the available topographic maps for the area, the lowest downstream toe of the basin embankment appears to be elevation 1417.7 at the location where Grove Avenue dead ends at the embankment. Based on the concept in the report, the proposed spillway would be at elevation 1428. This elevation is over 10-feet above the toe elevation and has a storage volume of 68.8 acre-feet. This would place the basin under DSOD jurisdiction. However, some of the storage volume is below the elevation of the downstream toe and can be removed in determining if the basin falls under DSOD jurisdiction. From the stage-storage tables in the report, there is approximately 10.5 acre-feet of storage below elevation 1417.7. If we deduct this from the total, the volume to the spillway is still 58.3 acre-feet (68.8 – 10.5). This volume and dam height clearly would place the proposed facility within the jurisdiction of the DSOD. The dam height and size are plotted as the blue circle on Figure 1.

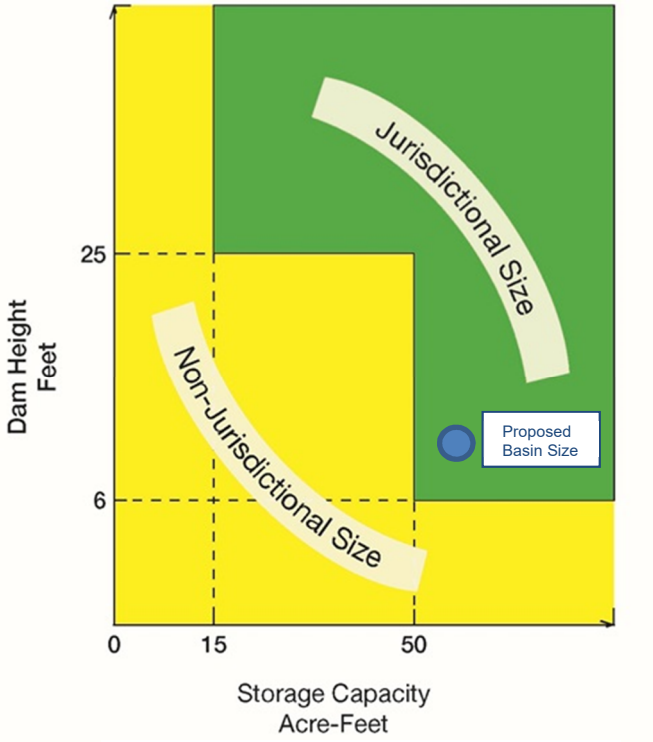



Figure 1 – DSOD Jurisdictional Size Chart

It is unlikely that the existing embankment would comply with DSOD foundation and embankment criteria. It should be anticipated that the existing embankment would need to be reconstructed with the project improvements, and the foundation for the embankment would need to be excavated to bedrock or other suitable material meeting DSOD criteria. The spillway would also need to be resized based on a Total Class Weight (TCW) for the basin which would be determined by DSOD. The storm-event return frequency for the spillway would vary between a 1,000-year storm event (minimum) to a return frequency of up to a 35,000-year event. These criteria have the ability to drastically increase the cost of modifications to the basin.

To avoid any chance of being classified as a dam, the maximum volume in the basin, above the embankment toe elevation of 1417.7', needs to be reduced to below 50 acre-feet. Using the stage-storage table in the Madole report, this elevation is approximately 1426.5'. The spillway crest needs to be at this elevation.

To reduce the ponded water depth without increasing the area of the basin, the configuration of the outlet structure needs to be revised. A key element in reducing the depth is to provide a higher discharge at lower water surface elevations. The current plan uses a 48-inch pipe to control the discharge. To make the basin work, this needs to be revised to a much wider opening. However, to control the peak discharge rate to be less than the existing condition, the height of the opening needs to be restricted.

***Recommended Modifications***

Based on the results of the review, it is recommended that the configuration of the outlet structure be revised to produce a similar peak flow rate reduction at a lower water surface elevation in the basin. The following criteria should be met with the revised design:

1. Maximum discharge from the basin is less than 248 cfs
2. Maximum water surface elevation in the basin is approximately 1426'. This will provide 0.5' of freeboard between the spillway crest and the 100-year water surface elevation. San Bernardino County Detention Basin Design Criteria does not require freeboard between the spillway and 100-year water surface elevation. However, we do recommend some freeboard be provided.
3. Spillway designed for the 1,000-year event (1.35 x 100-year flow rate) in accordance with County criteria. Required freeboard to the top of the dam embankment shall be above the 1,000-year water surface elevation.

Through a trial and error process we have determined an outlet configuration that would meet these criteria. Using a 9-foot wide x 1.5-foot high opening we can reduce the maximum water surface elevation to 1426.1' with a peak discharge of 246.7 cfs. This meets the peak discharge and maximum 100-year water surface elevation goals.

The recommended detention basin volumes and water surface elevations are shown in Figure 2 – Modified Detention Basin Volume. The area, depth, and volume in the table were revised from Madole Report. The stage-storage tables and calculations did not match in the Madole Report. Therefore, a new stage-storage relationship was prepared based on aerial topography recently completed for the project. The new values are included Figure 2. The basin grading plan used to determine the stage-storage curve is attached as Exhibit A.

The changes in the stage-discharge curve as a result of the new outlet structure configuration are shown in Figure 3 – Modified Detention Basin Depth-Volume-Discharge. This figure is taken from the Madole Report and edited to show the recommended changes. The changes are shown in red on the figure. The discharges through the 9-foot x 1.5-foot RCB are based on inlet control from Chart 8 (Scale 1) of the Hydraulic Design of Highway Culverts, Hydraulic Design Series 5, Federal Highway Administration.

The proposed revisions to the outlet structure are shown on Figure 4 – Outlet Box Structure Modifications. The figure is also taken from the Madole Report and edited to show the recommended changes in the outlet configuration. The changes are shown in red on the figure.

Figure 2

**15th Street Basin**
**Modified Detention Basin Volume Calculations**

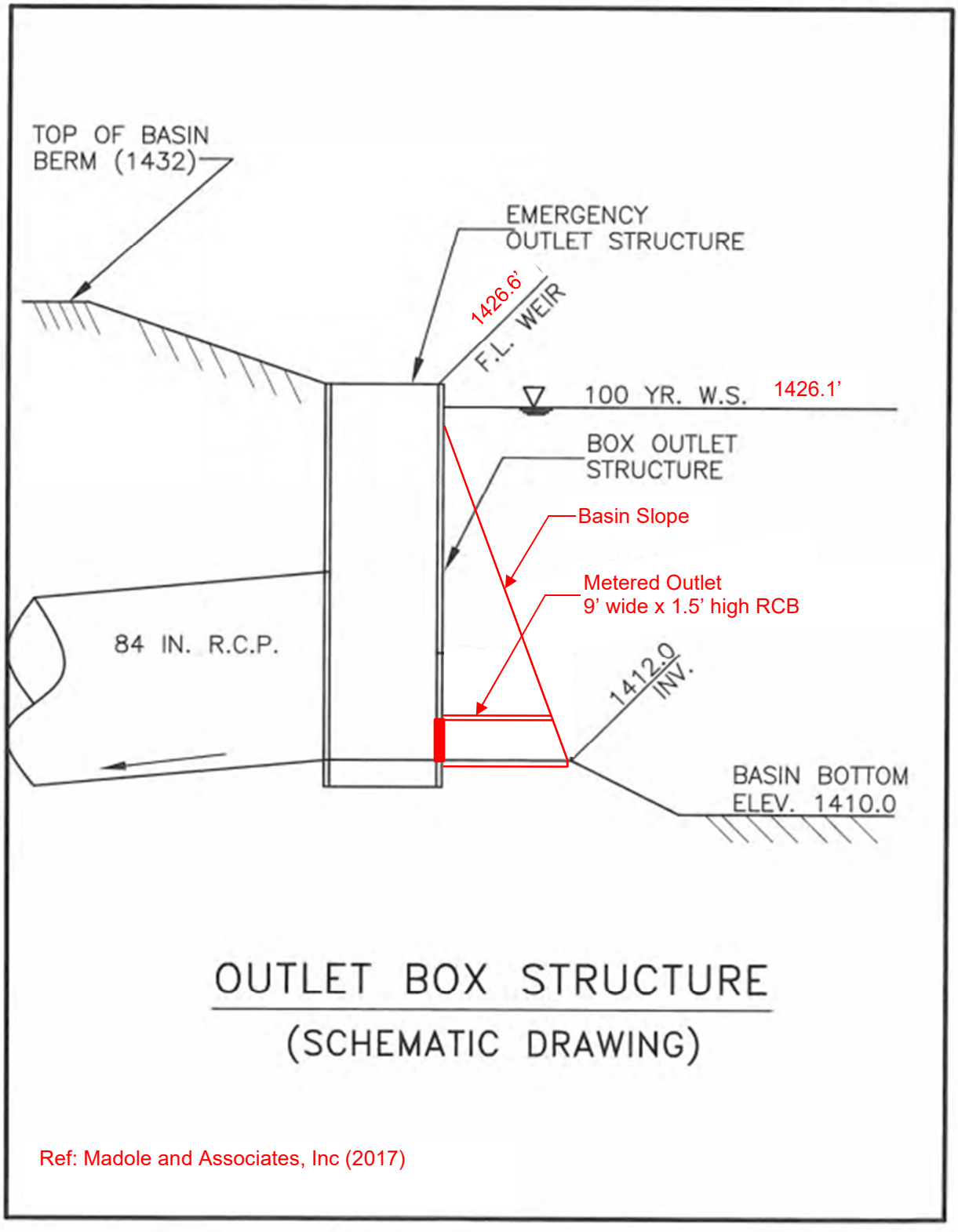
| Contour Elevation | Area (sf) | Depth (ft) | Volume (cu. ft) | Volume (ac. ft) | Total Volume (ac. ft) | Comments |
|---|---|---|---|---|---|---|
| 1410 | | | | | | |
| | | 0.5 | | | | |
| 1410.5 | | | | | | |
| | | 0.5 | | | | |
| 1411 | | | | | | |
| | | 0.5 | | | | |
| 1411.5 | | | | | | |
| | | 0.5 | | | | |
| 1412 | 43,125 | | | | 0.00 | |
| | | 0.5 | 22,535 | 0.52 | | |
| 1412.5 | 47,013 | | | | 0.52 | |
| | | 0.5 | 24,478 | 0.56 | | |
| 1413 | 50,900 | | | | 1.08 | |
| | | 0.5 | 26,494 | 0.61 | | |
| 1413.5 | 55,076 | | | | 1.69 | |
| | | 0.5 | 28,582 | 0.66 | | |
| 1414 | 59,252 | | | | 2.34 | |
| | | 0.5 | 30,727 | 0.71 | | |
| 1414.5 | 63,656 | | | | 3.05 | |
| | | 0.5 | 32,929 | 0.76 | | |
| 1415 | 68,060 | | | | 3.80 | |
| | | 1 | 74,187 | 1.70 | | |
| 1416 | 80,313 | | | | 5.51 | |
| | | 1 | 117,086 | 2.69 | | |
| 1417 | 153,858 | | | | 8.20 | |
| *1417.7* | | 1 | 164,112 | 3.77 | *10.84* | Toe of Embankment |
| 1418 | 174,365 | | | | 11.96 | |
| | | 1 | 183,149 | 4.20 | | |
| 1419 | 191,932 | | | | 16.17 | |
| | | 1 | 199,132 | 4.57 | | |
| 1420 | 206,332 | | | | 20.74 | |
| | | 1 | 213,422 | 4.90 | | |
| 1421 | 220,511 | | | | 25.64 | |
| | | 1 | 227,467 | 5.22 | | |
| 1422 | 234,422 | | | | 30.86 | |
| | | 2 | 494,839 | 11.36 | | |
| 1424 | 260,417 | | | | 42.22 | |
| | | 2 | 535,225 | 12.29 | | |
| 1426 | 274,808 | | | | 54.51 | Target 100-Yr WSE |
| | | 0.5 | 140,908 | 3.23 | | |
| 1426.5 | 288,823 | | | | 57.74 | Maximum Spillway Elevation |
| | | 1.5 | 452,975 | 10.40 | | |
| 1428 | 315,143 | | | | 68.14 | |
| | | 2 | 678,608 | 15.58 | | |
| 1430 | 363,465 | | | | 83.72 | |

## Figure 3 – Modified Detention Basin Depth-Volume-Discharge

| | Elev. | Depth ft. | Volume ac.-ft. | c.f.s. | PIPE c.f.s. 48" | Discharge c.f.s. | Total Discharge c.f.s. | Revised 9' x1.5' Opening c.f.s. |
|---|---|---|---|---|---|---|---|---|
| | 410 | | | | | | | |
| | 410.2 | 0 | 0.000 | 0.000 | 0 | 0 | 0.000 | |
| | 410.5 | 0 | 0.000 | 0.000 | 0 | 0 | 0.00 | |
| | 411 | 0 | 0.000 | 0.000 | 0 | 0 | 0.00 | |
| | 411.5 | 0 | 0.000 | 0.000 | 0 | 0 | 0.00 | |
| 1 | 412 | 0 | 0.000 | 0.000 | 0 | 0 | 0.00 | |
| 2 | 412.5 | 0.5 | 0.565 | 0.000 | 3.4 | 0 | 3.40 | 9 |
| 3 | 413 | 1 | 1.156 | 0.000 | 11.3 | 0 | 11.30 | 25 |
| 4 | 413.5 | 1.5 | 1.774 | 0.000 | 23 | 0 | 23.00 | 45 |
| 5 | 414 | 2 | 2.419 | 0.000 | 24 | 0 | 24.00 | 62 |
| 6 | 414.5 | 2.5 | 3.091 | 0.000 | 35 | 0 | 35.00 | 78 |
| 7 | 415 | 3 | 3.790 | 0.000 | 48 | 0 | 48.00 | 92 |
| 8 | 416 | 4 | 5.417 | 0.000 | 76 | 0 | 76.00 | 115 |
| 9 | 417 | 5 | 8.053 | 0.000 | 100 | 0 | 100.00 | 134 |
| 10 | 418 | 6 | 11.838 | 0.000 | 125 | 0 | 125.0 | 150 |
| 11 | 419 | 7 | 16.098 | 0.000 | 140 | 0 | 140.0 | 166 |
| 12 | 420 | 8 | 20.700 | 0.000 | 160 | 0 | 160.0 | 179 |
| 13 | 421 | 9 | 25.650 | 0.000 | 175 | 0 | 175.0 | 192 |
| 14 | 422 | 10 | 30.904 | 0.000 | 190 | 0 | 190.0 | 204 |
| 15 | 424 | 12 | 42.328 | 0.000 | 200 | 0 | 200.0 | 226 |
| 16 | 426 | 14 | 54.956 | 0.000 | 235 | 0 | 235.0 | 246 |
| 17 | 426.5 | 14.5 | 58.303 | 0.000 | 240 | 0 | 240.0 | 251 |
| 18 | 428 | 16 | 68.809 | 0.000 | 266 | 0 | 266.0 | 265 |
| 19 | 430 | 18 | 84.200 | 0.000 | 270 | 0 | 270.0 | 282 |

Ref: Madole and Associates, Inc (2017)

Figure 4 – Out Box Structure Modifications




Ref: Madole and Associates, Inc (2017)

***Hydraulic Calculations and Detention Basin Flood Routing Analysis***

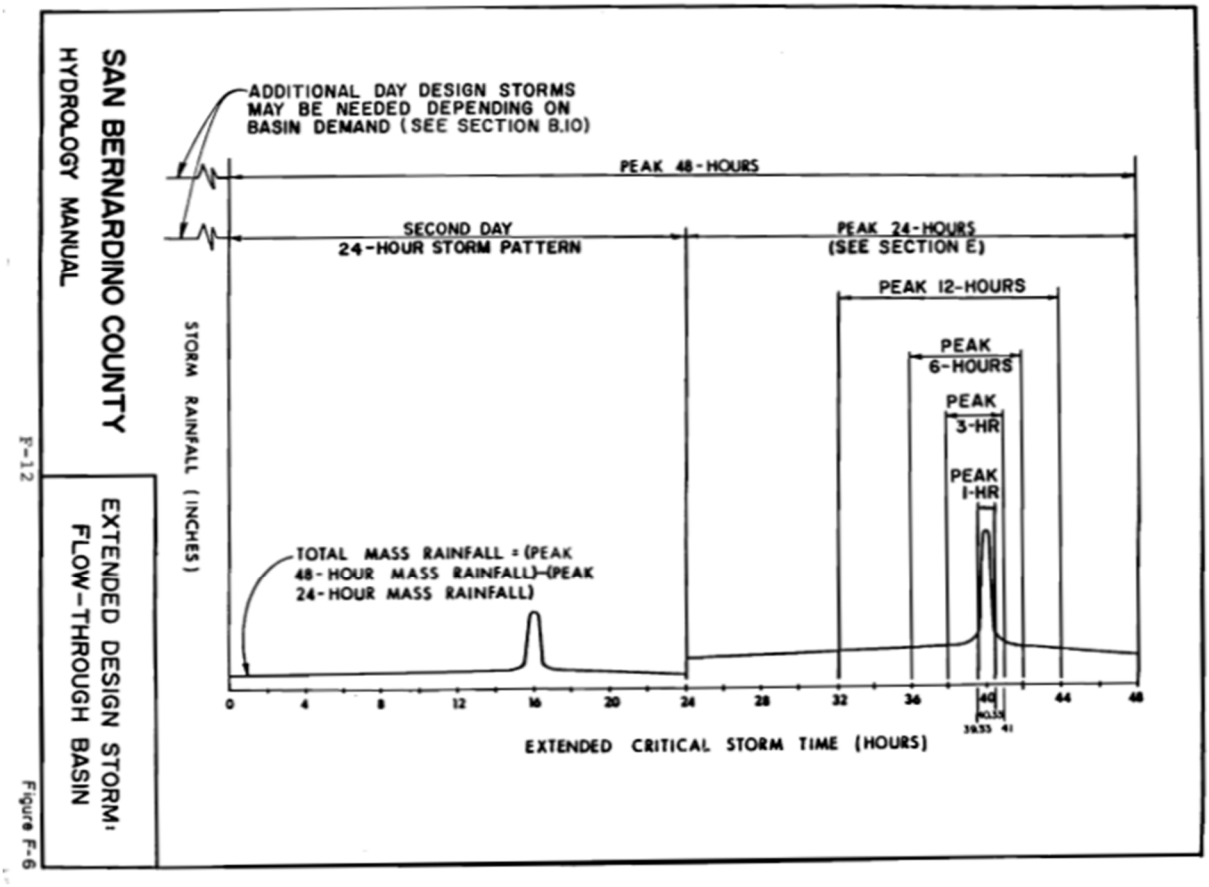
The discharge through the new outlet for a range of water surface elevations was calculated based on inlet control using the FHWA Hydraulic Design of Highway Culverts Manual, Chart 8, Scale 1, Headwater Depths for Box Culverts with Inlet Control. The analysis was run using the Dodson computer program. The results were used to establish the new Depth-Volume-Discharge values shown in the Figure 3. The Dodson results and copy of Chart 8 are included in the Technical Appendix.

The flood routing calculations were re-run using the AES Flood Routing Analysis program. The unit hydrographs were taken from the Madole Report. The hydrograph at flow process Node 9 to Node 81 was revised to use a 5-minute time step. This is a modification from the 10-minute time step in the Madole Report. All other hydrographs use the 5-minute time step and were not changed. The basin Depth-Volume-Discharge values were revised in the model to match the recommended configuration. The output from the AES run is provided in the technical appendix. The results of the analysis identified a peak discharge from the basin at 256.7 cfs, with a maximum depth of 14.1 feet. This corresponds to a maximum water surface elevation of 1426.1 feet. The results of the one-day (24 hour) analysis indicated that the detention basin did not fully drain at the end of the 24-hour period. In accordance with the requirements in the San Bernardino County Hydrology Manual, a multiday flood routing analysis was prepared to determine the critical design storm event for the basin.

A two-day storm analysis was prepared in accordance with the guidelines in the hydrology manual. The 2-day (48 hour) rainfall was taken for the NOAA Atlas 14 data used for the original analysis. The 48-hour rainfall is 12.0 inches, and the 24-hour rainfall is 8.57 inches. Therefore, the rainfall for the second day event is 3.43 inches (12.0” - 8.57”). The ratio of the second day rainfall to the 24-hour peak rainfall is 0.40 (3.43/8.57). This ratio was used to factor down the rainfall for the shorter duration events used in the flood routing analysis. The second day event was run prior to the peak 24-hour event in accordance with District criteria (see Figure 5).

The results of the second day analysis indicated that the basin had a residual depth of 1.17 feet with a storage volume of 1.293 acre-feet at the end of the 24-hour period. This volume was then input into the 24-hour peak flow analysis as the starting condition for the detention basin. The 24-hour peak flow was re-run with the new detention basin starting condition. The results of the analysis indicated that the 2-day analysis did not impact the peak discharge or maximum water surface depth in the basin. Therefore, no additional analysis is required, and the one-day (24-hour) analysis will govern for the design of the basin.

Figure 5 – Multiday Design Storm Pattern




***Conclusions***

The project is feasible with some variations to the recommendations in the Madole report. The outlet geometry should be revised to a 9' x 1.5' opening or similar based on the updated calculations, and the basin grading shall be revised to match Exhibit A. The freeboard between the maximum 100-year water surface elevation and the crest of the spillway is recommended to be 0.5 feet. The basin size would be reduced to less than 50 acre-feet between the spillway crest elevation and the lowest downstream toe of the embankment. The inlet and outlet pipe hydraulics would not change from the analysis in the Madole Report.

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# Technical Appendix

# Inlet Control Calculations
# (FHWA Chart 8, Scale 1)

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 26, 2018
15th Street Basin
9 x 1.5 RCB
Inlet Control Rating Curve

==========

PROGRAM INPUT DATA:

| DESCRIPTION | VALUE |
|---|---|
| Culvert Span (Width of Opening) (feet)..... | 9.00 |
| Culvert Rise (Height of Opening) (feet)..... | 1.50 |
| FHWA Chart Number (8,9,10,11,12 or 13)..... | 8 |
| Scale Number on Chart (Type of Culvert Entrance)..... | 1 |
| Manning`s Roughness Coefficient (n-value)..... | 0.0140 |
| Entrance Loss Coefficient of Culvert Opening..... | 0.50 |
| Culvert Length (feet)..... | 20.0 |
| Culvert Slope (feet per foot)..... | 0.0050 |

==========

PROGRAM RESULTS:

| Flow Rate (cfs) | Tailwater Depth (ft) | Headwater (ft) Inlet Control | Outlet Control | Normal Depth (ft) | Critical Depth (ft) | Depth at Outlet (ft) | Outlet Velocity (fps) |
|---|---|---|---|---|---|---|---|
| 9.0 | 0.00 | 0.49 | 0.82 | 0.31 | 0.31 | 0.31 | 3.18 |
| 25.0 | 0.00 | 0.99 | 1.05 | 0.58 | 0.62 | 0.62 | 4.47 |
| 45.0 | 0.00 | 1.48 | 1.40 | 0.84 | 0.92 | 0.84 | 5.95 |
| 62.0 | 0.00 | 1.99 | 1.78 | 1.03 | 1.14 | 1.03 | 6.67 |
| 78.0 | 0.00 | 2.50 | 2.20 | 1.20 | 1.33 | 1.20 | 7.23 |
| 92.0 | 0.00 | 3.00 | 2.63 | 1.34 | 1.50 | 1.34 | 7.65 |
| 115.0 | 0.00 | 4.01 | 3.32 | 1.50 | 1.50 | 1.50 | 8.52 |
| 134.0 | 0.00 | 5.01 | 4.01 | 1.50 | 1.50 | 1.50 | 9.93 |
| 150.0 | 0.00 | 5.97 | 4.67 | 1.50 | 1.50 | 1.50 | 11.11 |
| 166.0 | 0.00 | 7.04 | 5.40 | 1.50 | 1.50 | 1.50 | 12.30 |
| 179.0 | 0.00 | 7.98 | 6.05 | 1.50 | 1.50 | 1.50 | 13.26 |
| 192.0 | 0.00 | 9.00 | 6.75 | 1.50 | 1.50 | 1.50 | 14.22 |
| 204.0 | 0.00 | 10.01 | 7.45 | 1.50 | 1.50 | 1.50 | 15.11 |
| 226.0 | 0.00 | 12.00 | 8.82 | 1.50 | 1.50 | 1.50 | 16.74 |
| 251.0 | 0.00 | 14.52 | 10.55 | 1.50 | 1.50 | 1.50 | 18.59 |
| 265.0 | 0.00 | 16.05 | 11.60 | 1.50 | 1.50 | 1.50 | 19.63 |
| 282.0 | 0.00 | 18.01 | 12.95 | 1.50 | 1.50 | 1.50 | 20.89 |

==========

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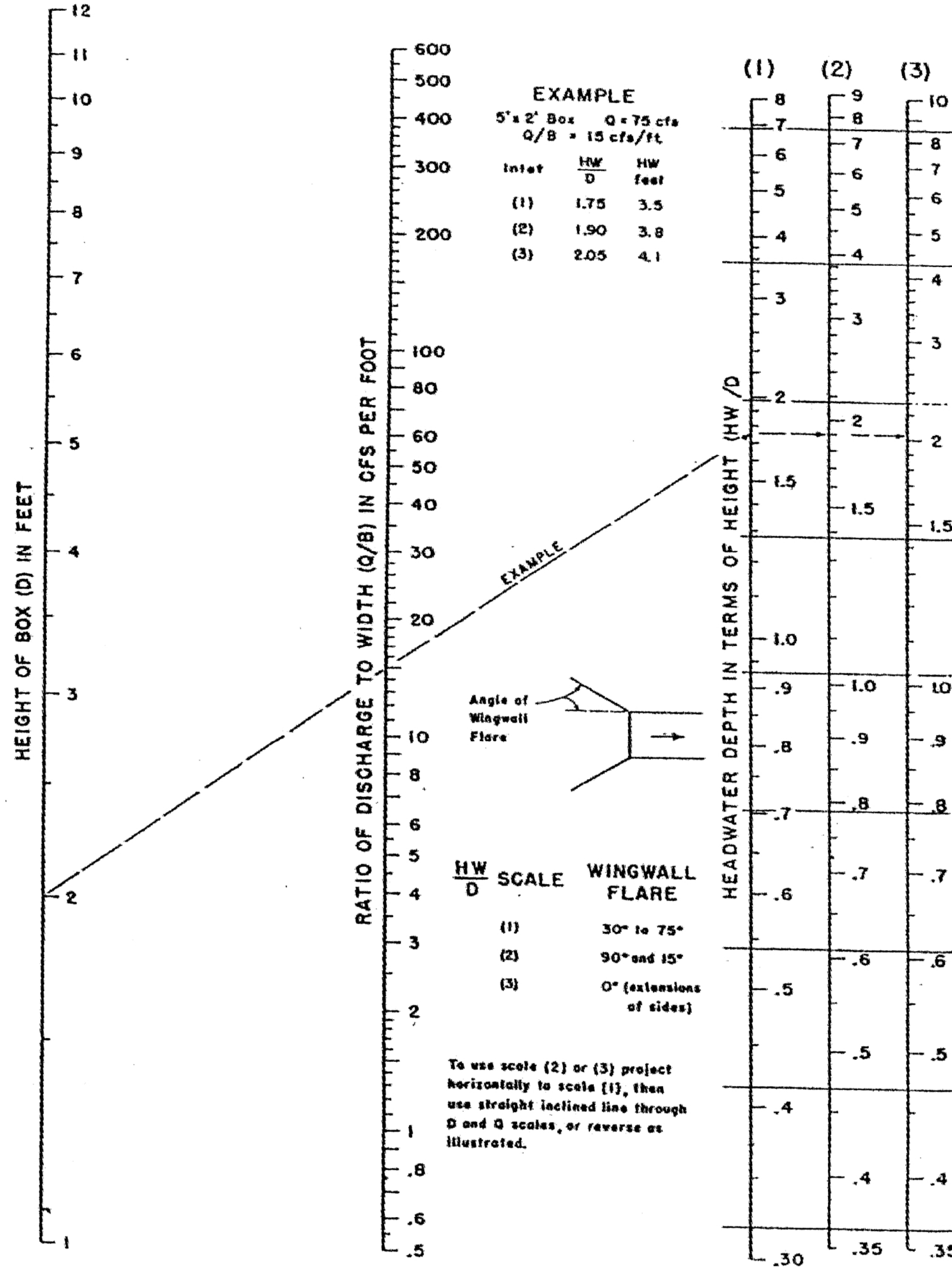
# CHART 8


HEIGHT OF BOX (D) IN FEET
RATIO OF DISCHARGE TO WIDTH (Q/B) IN CFS PER FOOT
HEADWATER DEPTH IN TERMS OF HEIGHT (HW /D
(1)
(2)
(3)
EXAMPLE
5' x 2' Box Q = 75 cfs
Q/B = 15 cfs/ft
Inlet HW/D HW feet
(1) 1.75 3.5
(2) 1.90 3.8
(3) 2.05 4.1
EXAMPLE
Angle of Wingwall Flare
HW/D SCALE
WINGWALL FLARE
(1) 30° to 75°
(2) 90° and 15°
(3) 0° (extensions of sides)
To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.

# Flood Routing Analysis
# Single Day (24-Hour) Event

```
**************************************************************************

            F L O O D    R O U T I N G    A N A L Y S I S
         USING COUNTY HYDROLOGY MANUAL OF SAN BERNARDINO(1986)
        (c) Copyright 1989-2015 Advanced Engineering Software (aes)
            Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* 15th Street Basin Modified - 24 Hour Event                           *
* 9' x 1.5' Outlet Openning                                            *
* File: E15CRR                                                         *
 **************************************************************************

  FILE NAME: C:\aes2015\hydrosft\floodX\E15CRR.fld
  TIME/DATE OF STUDY: 09:37 07/31/2018



**************************************************************************
  FLOW PROCESS FROM NODE     9.00 TO NODE    81.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =     379.090 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.320 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.390
         LOW LOSS FRACTION = 0.365
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

         *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.980
          30-MINUTE FACTOR = 0.980
           1-HOUR FACTOR = 0.980
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
```

```
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  26.042


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 1.572                72.053
        2                 8.065               297.710
        3                22.451               659.544
        4                41.662               880.717
        5                63.212               988.028
        6                79.350               739.862
        7                88.790               432.771
        8                94.038               240.601
        9                96.928               132.516
       10                98.232                59.761
       11                98.721                22.406
       12                99.209                22.385
       13                99.684                21.759
       14                99.921                10.880
       15               100.000                 3.627


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      93.0661
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =     177.5757
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 175.0 350.0 525.0 700.0 |
|---|---|---|---|
| 15.000 | 85.9579 | 143.23 | . Q . V. . . |
| 15.083 | 86.9716 | 147.18 | . Q . V. . . |
| 15.167 | 88.0147 | 151.46 | . Q . V. . . |
| 15.250 | 89.0907 | 156.24 | . Q . V . . |
| 15.333 | 90.2030 | 161.50 | . Q. V . . |
| 15.417 | 91.3530 | 166.99 | . Q. V . . |
| 15.500 | 92.5351 | 171.64 | . Q. V . . |
| 15.583 | 93.7400 | 174.94 | . Q. .V . . |
| 15.667 | 94.9660 | 178.02 | . Q .V . . |
| 15.750 | 96.2227 | 182.47 | . Q .V . . |
| 15.833 | 97.5415 | 191.49 | . Q .V . . |
| 15.917 | 98.9807 | 208.98 | . .Q . V . . |
| 16.000 | 100.6408 | 241.05 | . . Q . V . . |
| 16.083 | 102.8102 | 314.99 | . . Q . V . . |
| 16.167 | 105.8805 | 445.82 | . . . V Q . . |
| 16.250 | 110.0457 | 604.79 | . . . V . Q . |
| 16.333 | 114.7813 | 687.60 | . . . V . Q. |
| 16.417 | 119.5373 | 690.58 | . . . V . Q. |
| 16.500 | 123.4003 | 560.91 | . . . V . Q . |
| 16.583 | 126.2454 | 413.10 | . . . Q V . . |
| 16.667 | 128.3936 | 311.92 | . . Q . V . . |
| 16.750 | 130.1084 | 248.98 | . . Q . V. . |
| 16.833 | 131.5249 | 205.67 | . .Q . V. . |
| 16.917 | 132.7604 | 179.40 | . Q . V. . |
| 17.000 | 133.9167 | 167.89 | . Q. . V . |
| 17.083 | 135.0027 | 157.69 | . Q. . V . |
| 17.167 | 136.0033 | 145.30 | . Q . . V . |
| 17.250 | 136.9332 | 135.01 | . Q . . V . |
| 17.333 | 137.8086 | 127.11 | . Q . . .V . |
| 17.417 | 138.6436 | 121.25 | . Q . . .V . |
| 17.500 | 139.4442 | 116.24 | . Q . . .V . |
| 17.583 | 140.2153 | 111.97 | . Q . . .V . |
| 17.667 | 140.9608 | 108.24 | . Q . . .V . |
| 17.750 | 141.6836 | 104.95 | . Q . . .V . |
| 17.833 | 142.3862 | 102.02 | . Q . . . V . |
| 17.917 | 143.0704 | 99.36 | . Q . . . V . |
| 18.000 | 143.7379 | 96.91 | . Q . . . V . |
| 18.083 | 144.3900 | 94.69 | . Q . . . V . |
| 18.167 | 145.0288 | 92.76 | . Q . . . V . |
| 18.250 | 145.6567 | 91.17 | . Q . . . V . |
| 18.333 | 146.2755 | 89.84 | . Q . . . V . |
| 18.417 | 146.8862 | 88.68 | . Q . . . . V . |
| 18.500 | 147.4888 | 87.49 | . Q . . . . V . |
| 18.583 | 148.0827 | 86.23 | . Q . . . . V . |
| 18.667 | 148.6677 | 84.94 | . Q . . . . V . |
| 18.750 | 149.2439 | 83.67 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      175.0     350.0     525.0     700.0
--------------------------------------------------------------------------------
  18.833    149.8117     82.43  .   Q     .         .         .  V      .
  18.917    150.3711     81.23  .   Q     .         .         .  V      .
  19.000    150.9227     80.09  .   Q     .         .         .  V      .
  19.083    151.4668     79.00  .   Q     .         .         .   V     .
  19.167    152.0037     77.96  .   Q     .         .         .   V     .
  19.250    152.5337     76.95  .   Q     .         .         .   V     .
  19.333    153.0570     75.99  .   Q     .         .         .   V     .
  19.417    153.5739     75.06  .   Q     .         .         .   V     .
  19.500    154.0847     74.17  .   Q     .         .         .   V     .
  19.583    154.5897     73.32  .   Q     .         .         .   V     .
  19.667    155.0889     72.49  .   Q     .         .         .   V     .
  19.750    155.5827     71.70  .   Q     .         .         .    V    .
  19.833    156.0712     70.93  .   Q     .         .         .    V    .
  19.917    156.5547     70.19  .   Q     .         .         .    V    .
  20.000    157.0332     69.48  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           655.0
            20%                           140.0
            30%                            55.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            20.0
            90%                            10.0



********************************************************************************
  FLOW PROCESS FROM NODE   109.00 TO NODE   251.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #2)

         WATERSHED AREA =      60.740 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.260 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.380
         LOW LOSS FRACTION = 0.358
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  32.051


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


=============================================================================
                      UNIT HYDROGRAPH DETERMINATION

-----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
-----------------------------------------------------------------------------
        1                 2.050                15.056
        2                12.541                77.066
        3                32.902               149.568
        4                59.287               193.817
        5                79.698               149.934
        6                90.409                78.679
        7                95.683                38.739
        8                97.996                16.991
        9                98.702                 5.189
       10                99.294                 4.352
       11                99.718                 3.110
       12                99.929                 1.555
       13               100.000                 0.518


-----------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      14.6203
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      28.7433
-----------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 14.0464 | 23.65 | . Q . V. . . |
| 15.083 | 14.2139 | 24.32 | . Q . V. . . |
| 15.167 | 14.3866 | 25.07 | . Q . V . . |
| 15.250 | 14.5649 | 25.89 | . Q . V . . |
| 15.333 | 14.7496 | 26.82 | . Q . V . . |
| 15.417 | 14.9407 | 27.75 | . Q . V . . |
| 15.500 | 15.1364 | 28.41 | . Q . .V . . |
| 15.583 | 15.3344 | 28.75 | . Q . .V . . |
| 15.667 | 15.5346 | 29.07 | . Q . .V . . |
| 15.750 | 15.7416 | 30.06 | . Q . .V . . |
| 15.833 | 15.9633 | 32.19 | . Q . . V . . |
| 15.917 | 16.2101 | 35.84 | . Q . . V . . |
| 16.000 | 16.5046 | 42.76 | . Q . . V . . |
| 16.083 | 16.9074 | 58.49 | . .Q . V . . |
| 16.167 | 17.5226 | 89.33 | . . Q . V . . |
| 16.250 | 18.3352 | 117.99 | . . . Q V . . |
| 16.333 | 19.2156 | 127.84 | . . . QV . . |
| 16.417 | 19.9321 | 104.02 | . . Q V . . |
| 16.500 | 20.4229 | 71.28 | . . Q . V . . |
| 16.583 | 20.7722 | 50.72 | . Q . V . . |
| 16.667 | 21.0399 | 38.87 | . Q . . V. . |
| 16.750 | 21.2608 | 32.07 | . Q . . V. . |
| 16.833 | 21.4633 | 29.40 | . Q . . V. . |
| 16.917 | 21.6496 | 27.06 | . Q . . V . |
| 17.000 | 21.8211 | 24.91 | . Q . . V . |
| 17.083 | 21.9807 | 23.17 | . Q . . V . |
| 17.167 | 22.1309 | 21.81 | . Q . . V . |
| 17.250 | 22.2737 | 20.74 | . Q . . V . |
| 17.333 | 22.4098 | 19.76 | . Q . . .V . |
| 17.417 | 22.5401 | 18.92 | . Q . . .V . |
| 17.500 | 22.6656 | 18.21 | . Q . . .V . |
| 17.583 | 22.7868 | 17.61 | . Q . . .V . |
| 17.667 | 22.9044 | 17.07 | . Q . . .V . |
| 17.750 | 23.0187 | 16.60 | . Q . . . V . |
| 17.833 | 23.1300 | 16.16 | . Q . . . V . |
| 17.917 | 23.2385 | 15.76 | . Q . . . V . |
| 18.000 | 23.3445 | 15.39 | . Q . . . V . |
| 18.083 | 23.4483 | 15.06 | . Q . . . V . |
| 18.167 | 23.5501 | 14.79 | . Q . . . V . |
| 18.250 | 23.6504 | 14.57 | . Q . . . V . |
| 18.333 | 23.7496 | 14.40 | . Q . . . . V . |
| 18.417 | 23.8476 | 14.22 | . Q . . . . V . |
| 18.500 | 23.9441 | 14.02 | . Q . . . . V . |
| 18.583 | 24.0392 | 13.81 | . Q . . . . V . |
| 18.667 | 24.1329 | 13.60 | . Q . . . . V . |
| 18.750 | 24.2251 | 13.40 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     24.3160     13.20  . Q       .         .         .  V      .
  18.917     24.4057     13.01  . Q       .         .         .  V      .
  19.000     24.4941     12.83  . Q       .         .         .   V     .
  19.083     24.5813     12.66  . Q       .         .         .   V     .
  19.167     24.6673     12.50  . Q       .         .         .   V     .
  19.250     24.7523     12.34  . Q       .         .         .   V     .
  19.333     24.8363     12.19  . Q       .         .         .   V     .
  19.417     24.9192     12.04  . Q       .         .         .   V     .
  19.500     25.0012     11.90  . Q       .         .         .   V     .
  19.583     25.0823     11.77  . Q       .         .         .   V     .
  19.667     25.1625     11.64  . Q       .         .         .    V    .
  19.750     25.2418     11.52  . Q       .         .         .    V    .
  19.833     25.3203     11.40  . Q       .         .         .    V    .
  19.917     25.3979     11.28  . Q       .         .         .    V    .
  20.000     25.4748     11.17  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           485.0
            20%                           105.0
            30%                            45.0
            40%                            30.0
            50%                            25.0
            60%                            20.0
            70%                            15.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   309.00 TO NODE   361.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #3)

         WATERSHED AREA =      81.340 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.300 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.410
         LOW LOSS FRACTION = 0.378
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

         *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.980
          30-MINUTE FACTOR = 0.980
           1-HOUR FACTOR = 0.980
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  27.778


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 1.701                16.730
        2                 9.283                74.585
        3                25.290               157.462
        4                46.738               210.990
        5                68.920               218.201
        6                83.414               142.577
        7                91.365                78.214
        8                95.710                42.750
        9                97.845                21.003
       10                98.542                 6.849
       11                99.063                 5.124
       12                99.583                 5.124
       13               100.000                 4.099


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      20.6973
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      37.3737
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 18.1187 | 30.29 | . Q . V. . . |
| 15.083 | 18.3332 | 31.14 | . Q . V. . . |
| 15.167 | 18.5539 | 32.06 | . Q . V. . . |
| 15.250 | 18.7818 | 33.08 | . Q . V . . |
| 15.333 | 19.0174 | 34.22 | . Q . V . . |
| 15.417 | 19.2612 | 35.39 | . Q . V . . |
| 15.500 | 19.5115 | 36.34 | . Q . V . . |
| 15.583 | 19.7661 | 36.98 | . Q . .V . . |
| 15.667 | 20.0247 | 37.54 | . Q . .V . . |
| 15.750 | 20.2901 | 38.53 | . Q . .V . . |
| 15.833 | 20.5702 | 40.67 | . Q . . V . . |
| 15.917 | 20.8778 | 44.67 | . Q . . V . . |
| 16.000 | 21.2364 | 52.06 | . Q . V . . |
| 16.083 | 21.7130 | 69.21 | . . Q . V . . |
| 16.167 | 22.4078 | 100.88 | . . Q V . . |
| 16.250 | 23.3473 | 136.42 | . . . V Q . . |
| 16.333 | 24.4078 | 153.98 | . . . V Q . |
| 16.417 | 25.4216 | 147.21 | . . . V Q. . |
| 16.500 | 26.1888 | 111.39 | . . . Q V . . |
| 16.583 | 26.7414 | 80.23 | . . Q . V . . |
| 16.667 | 27.1609 | 60.92 | . Q . V. . |
| 16.750 | 27.4955 | 48.59 | . Q. . V. . |
| 16.833 | 27.7740 | 40.42 | . Q . . V. . |
| 16.917 | 28.0294 | 37.09 | . Q . . V. . |
| 17.000 | 28.2687 | 34.75 | . Q . . V . |
| 17.083 | 28.4910 | 32.28 | . Q . . V . |
| 17.167 | 28.6921 | 29.20 | . Q . . V . |
| 17.250 | 28.8825 | 27.65 | . Q . . V . |
| 17.333 | 29.0638 | 26.33 | . Q . . .V . |
| 17.417 | 29.2371 | 25.16 | . Q . . .V . |
| 17.500 | 29.4034 | 24.15 | . Q . . .V . |
| 17.583 | 29.5637 | 23.29 | . Q . . .V . |
| 17.667 | 29.7189 | 22.54 | . Q . . .V . |
| 17.750 | 29.8696 | 21.87 | . Q . . .V . |
| 17.833 | 30.0161 | 21.28 | . Q . . . V . |
| 17.917 | 30.1589 | 20.73 | . Q . . . V . |
| 18.000 | 30.2982 | 20.23 | . Q . . . V . |
| 18.083 | 30.4344 | 19.77 | . Q . . . V . |
| 18.167 | 30.5679 | 19.38 | . Q . . . V . |
| 18.250 | 30.6992 | 19.07 | . Q . . . V . |
| 18.333 | 30.8287 | 18.81 | . Q . . . V . |
| 18.417 | 30.9567 | 18.57 | . Q . . . . V . |
| 18.500 | 31.0829 | 18.32 | . Q . . . . V . |
| 18.583 | 31.2072 | 18.05 | . Q . . . . V . |
| 18.667 | 31.3297 | 17.78 | . Q . . . . V . |
| 18.750 | 31.4503 | 17.52 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     31.5691     17.26  .  Q      .         .         .  V      .
  18.917     31.6863     17.01  .  Q      .         .         .  V      .
  19.000     31.8018     16.77  .  Q      .         .         .   V     .
  19.083     31.9157     16.55  .  Q      .         .         .   V     .
  19.167     32.0282     16.33  .  Q      .         .         .   V     .
  19.250     32.1392     16.12  .  Q      .         .         .   V     .
  19.333     32.2488     15.92  .  Q      .         .         .   V     .
  19.417     32.3571     15.72  .  Q      .         .         .   V     .
  19.500     32.4641     15.54  .  Q      .         .         .   V     .
  19.583     32.5699     15.36  .  Q      .         .         .   V     .
  19.667     32.6746     15.19  .  Q      .         .         .   V     .
  19.750     32.7780     15.03  .  Q      .         .         .    V    .
  19.833     32.8804     14.87  . Q       .         .         .    V    .
  19.917     32.9817     14.71  . Q       .         .         .    V    .
  20.000     33.0820     14.56  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           570.0
            20%                           125.0
            30%                            50.0
            40%                            35.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0



********************************************************************************
  FLOW PROCESS FROM NODE   409.00 TO NODE   431.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #4)

         WATERSHED AREA =      62.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.240 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.340
         LOW LOSS FRACTION = 0.322
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  34.722


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 2.308                17.499
        2                14.779                94.568
        3                38.225               177.789
        4                66.233               212.371
        5                84.561               138.980
        6                93.250                65.884
        7                97.213                30.057
        8                98.477                 9.578
        9                99.128                 4.936
       10                99.651                 3.969
       11                99.913                 1.985
       12               100.000                 0.662


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      13.5705
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      31.1916
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 15.3579 | 25.95 | . Q . V. . . |
| 15.083 | 15.5418 | 26.70 | . Q . V. . . |
| 15.167 | 15.7314 | 27.53 | . Q . V . . |
| 15.250 | 15.9273 | 28.45 | . Q . V . . |
| 15.333 | 16.1304 | 29.49 | . Q . V . . |
| 15.417 | 16.3406 | 30.52 | . Q . V . . |
| 15.500 | 16.5553 | 31.18 | . Q . .V . . |
| 15.583 | 16.7717 | 31.42 | . Q . .V . . |
| 15.667 | 16.9903 | 31.75 | . Q . .V . . |
| 15.750 | 17.2180 | 33.05 | . Q . . V . . |
| 15.833 | 17.4635 | 35.64 | . Q . . V . . |
| 15.917 | 17.7384 | 39.93 | . Q . . V . . |
| 16.000 | 18.0693 | 48.04 | . Q. . V . . |
| 16.083 | 18.5256 | 66.25 | . . Q . V . . |
| 16.167 | 19.2326 | 102.65 | . . Q V . . |
| 16.250 | 20.1504 | 133.26 | . . . VQ . . |
| 16.333 | 21.0950 | 137.16 | . . . Q . . |
| 16.417 | 21.7994 | 102.28 | . . Q V . . |
| 16.500 | 22.2689 | 68.18 | . . Q . V . . |
| 16.583 | 22.6071 | 49.10 | . Q. . V . . |
| 16.667 | 22.8707 | 38.27 | . Q . . V. . |
| 16.750 | 23.1035 | 33.80 | . Q . . V. . |
| 16.833 | 23.3174 | 31.06 | . Q . . V. . |
| 16.917 | 23.5130 | 28.41 | . Q . . V . |
| 17.000 | 23.6940 | 26.27 | . Q . . V . |
| 17.083 | 23.8638 | 24.66 | . Q . . V . |
| 17.167 | 24.0252 | 23.44 | . Q . . V . |
| 17.250 | 24.1789 | 22.31 | . Q . . .V . |
| 17.333 | 24.3253 | 21.27 | . Q . . .V . |
| 17.417 | 24.4657 | 20.39 | . Q . . .V . |
| 17.500 | 24.6010 | 19.65 | . Q . . .V . |
| 17.583 | 24.7320 | 19.02 | . Q . . .V . |
| 17.667 | 24.8592 | 18.46 | . Q . . .V . |
| 17.750 | 24.9828 | 17.96 | . Q . . . V . |
| 17.833 | 25.1033 | 17.49 | . Q . . . V . |
| 17.917 | 25.2208 | 17.07 | . Q . . . V . |
| 18.000 | 25.3357 | 16.68 | . Q . . . V . |
| 18.083 | 25.4481 | 16.32 | . Q . . . V . |
| 18.167 | 25.5586 | 16.04 | . Q . . . V . |
| 18.250 | 25.6676 | 15.82 | . Q . . . V . |
| 18.333 | 25.7753 | 15.65 | . Q . . . . V . |
| 18.417 | 25.8818 | 15.45 | . Q . . . . V . |
| 18.500 | 25.9866 | 15.23 | . Q . . . . V . |
| 18.583 | 26.0899 | 15.00 | . Q . . . . V . |
| 18.667 | 26.1916 | 14.77 | . Q . . . . V . |
| 18.750 | 26.2918 | 14.55 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     26.3905     14.34  . Q       .         .         .  V      .
  18.917     26.4879     14.13  . Q       .         .         .  V      .
  19.000     26.5839     13.94  . Q       .         .         .   V     .
  19.083     26.6786     13.76  . Q       .         .         .   V     .
  19.167     26.7721     13.58  . Q       .         .         .   V     .
  19.250     26.8645     13.41  . Q       .         .         .   V     .
  19.333     26.9557     13.25  . Q       .         .         .   V     .
  19.417     27.0459     13.09  . Q       .         .         .   V     .
  19.500     27.1350     12.94  . Q       .         .         .   V     .
  19.583     27.2231     12.79  . Q       .         .         .   V     .
  19.667     27.3102     12.65  . Q       .         .         .    V    .
  19.750     27.3965     12.52  . Q       .         .         .    V    .
  19.833     27.4818     12.39  . Q       .         .         .    V    .
  19.917     27.5662     12.26  . Q       .         .         .    V    .
  20.000     27.6499     12.14  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
              0%                        1205.0
             10%                         500.0
             20%                         110.0
             30%                          40.0
             40%                          30.0
             50%                          20.0
             60%                          20.0
             70%                          20.0
             80%                          10.0
             90%                          10.0


********************************************************************************
  FLOW PROCESS FROM NODE    81.00 TO NODE   251.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 2 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   251.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      225.0     450.0     675.0     900.0
----------------------------------------------------------------------------
  15.000    100.0044    166.88  .      Q  .        V.          .         .
  15.083    101.1855    171.51  .      Q  .        V.          .         .
  15.167    102.4013    176.53  .      Q  .        V.          .         .
  15.250    103.6556    182.13  .       Q .         V          .         .
  15.333    104.9525    188.31  .       Q .         V          .         .
  15.417    106.2937    194.74  .       Q .         V          .         .
  15.500    107.6715    200.05  .       Q .         V          .         .
  15.583    109.0743    203.69  .        Q.         .V         .         .
  15.667    110.5005    207.08  .        Q.         .V         .         .
  15.750    111.9642    212.54  .        Q.         .V         .         .
  15.833    113.5048    223.68  .        Q.         . V        .         .
  15.917    115.1908    244.81  .         Q         . V        .         .
  16.000    117.1454    283.81  .         . Q       . V        .         .
  16.083    119.7175    373.47  .         .     Q   .  V       .         .
  16.167    123.4031    535.15  .         .         .  Q       .         .
  16.250    128.3809    722.78  .         .         .   V      . Q       .
  16.333    133.9969    815.44  .         .         .    V     .     Q   .
  16.417    139.4693    794.60  .         .         .      V   .    Q    .
  16.500    143.8233    632.19  .         .         .      VQ  .         .
  16.583    147.0176    463.82  .         .        Q       V  .         .
  16.667    149.4335    350.80  .         .    Q   .       V  .         .
  16.750    151.3691    281.05  .         . Q      .        V.         .
  16.833    152.9881    235.07  .         Q        .        V.         .
  16.917    154.4100    206.46  .        Q.        .        V.         .
  17.000    155.7378    192.80  .       Q .        .         V         .
  17.083    156.9833    180.85  .       Q .        .         V         .
  17.167    158.1342    167.10  .      Q  .        .         V         .
  17.250    159.2068    155.75  .     Q   .        .         V         .
  17.333    160.2184    146.87  .     Q   .        .         .V        .
  17.417    161.1837    140.17  .     Q   .        .         .V        .
  17.500    162.1097    134.45  .    Q    .        .         .V        .
  17.583    163.0021    129.57  .    Q    .        .         .V        .
  17.667    163.8651    125.31  .    Q    .        .         .V        .
  17.750    164.7022    121.55  .    Q    .        .         .V        .
  17.833    165.5161    118.18  .    Q    .        .         . V       .
  17.917    166.3089    115.12  .    Q    .        .         . V       .
  18.000    167.0824    112.30  .   Q     .        .         . V       .
  18.083    167.8382    109.75  .   Q     .        .         . V       .
  18.167    168.5788    107.54  .   Q     .        .         . V       .
  18.250    169.3071    105.75  .   Q     .        .         . V       .
  18.333    170.0250    104.24  .   Q     .        .         . V       .
  18.417    170.7337    102.91  .   Q     .        .         .  V      .
  18.500    171.4329    101.51  .   Q     .        .         .  V      .
  18.583    172.1218    100.04  .   Q     .        .         .  V      .
  18.667    172.8005     98.54  .   Q     .        .         .  V      .
  18.750    173.4690     97.07  .   Q     .        .         .  V      .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      225.0     450.0     675.0     900.0
--------------------------------------------------------------------------------
  18.833    174.1276     95.63  .   Q     .         .         .  V      .
  18.917    174.7767     94.25  .   Q     .         .         .  V      .
  19.000    175.4167     92.93  .   Q     .         .         .   V     .
  19.083    176.0480     91.67  .   Q     .         .         .   V     .
  19.167    176.6710     90.45  .   Q     .         .         .   V     .
  19.250    177.2859     89.29  .  Q      .         .         .   V     .
  19.333    177.8932     88.18  .  Q      .         .         .   V     .
  19.417    178.4931     87.10  .  Q      .         .         .   V     .
  19.500    179.0859     86.08  .  Q      .         .         .   V     .
  19.583    179.6719     85.09  .  Q      .         .         .   V     .
  19.667    180.2513     84.13  .  Q      .         .         .   V     .
  19.750    180.8244     83.21  .  Q      .         .         .    V    .
  19.833    181.3914     82.33  .  Q      .         .         .    V    .
  19.917    181.9525     81.47  .  Q      .         .         .    V    .
  20.000    182.5079     80.65  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           630.0
            20%                           135.0
            30%                            55.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   361.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 3 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   361.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      250.0     500.0     750.0    1000.0
----------------------------------------------------------------------------
  15.000    118.1230    197.18  .      Q  .        V.          .          .
  15.083    119.5187    202.65  .       Q .        V.          .          .
  15.167    120.9552    208.58  .       Q .        V.          .          .
  15.250    122.4374    215.21  .       Q .         V          .          .
  15.333    123.9699    222.53  .       Q .         V          .          .
  15.417    125.5549    230.13  .        Q.         V          .          .
  15.500    127.1829    236.40  .        Q.         V          .          .
  15.583    128.8404    240.67  .        Q.         .V         .          .
  15.667    130.5252    244.63  .        Q.         .V         .          .
  15.750    132.2543    251.07  .         Q         .V         .          .
  15.833    134.0750    264.36  .         Q         . V        .          .
  15.917    136.0686    289.48  .         .Q        . V        .          .
  16.000    138.3818    335.87  .         .  Q      . V        .          .
  16.083    141.4305    442.68  .         .      Q  .  V       .          .
  16.167    145.8109    636.02  .         .         .  V Q     .          .
  16.250    151.7282    859.20  .         .         .   V      .   Q      .
  16.333    158.4046    969.42  .         .         .     V    .       Q .
  16.417    164.8909    941.81  .         .         .      V   .      Q  .
  16.500    170.0120    743.58  .         .         .      V Q.         .
  16.583    173.7589    544.05  .         .        .Q      V .          .
  16.667    176.5945    411.72  .         .     Q  .       V .          .
  16.750    178.8647    329.63  .         .  Q      .        V.          .
  16.833    180.7620    275.49  .         .Q        .        V.          .
  16.917    182.4393    243.54  .        Q.         .        V.          .
  17.000    184.0065    227.55  .        Q.         .         V          .
  17.083    185.4743    213.13  .       Q .         .         V          .
  17.167    186.8263    196.30  .      Q  .         .         V          .
  17.250    188.0894    183.40  .      Q  .         .         V          .
  17.333    189.2822    173.20  .     Q   .         .         .V         .
  17.417    190.4208    165.32  .     Q   .         .         .V         .
  17.500    191.5131    158.60  .     Q   .         .         .V         .
  17.583    192.5658    152.86  .     Q   .         .         .V         .
  17.667    193.5840    147.85  .    Q    .         .         .V         .
  17.750    194.5718    143.42  .    Q    .         .         .V         .
  17.833    195.5322    139.45  .    Q    .         .         . V        .
  17.917    196.4678    135.85  .    Q    .         .         . V        .
  18.000    197.3806    132.53  .    Q    .         .         . V        .
  18.083    198.2726    129.52  .    Q    .         .         . V        .
  18.167    199.1467    126.93  .    Q    .         .         . V        .
  18.250    200.0063    124.81  .   Q     .         .         . V        .
  18.333    200.8538    123.05  .   Q     .         .         . V        .
  18.417    201.6904    121.48  .   Q     .         .         .  V       .
  18.500    202.5157    119.83  .   Q     .         .         .  V       .
  18.583    203.3290    118.09  .   Q     .         .         .  V       .
  18.667    204.1302    116.33  .   Q     .         .         .  V       .
  18.750    204.9193    114.58  .   Q     .         .         .  V       .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      250.0     500.0     750.0    1000.0
--------------------------------------------------------------------------------
  18.833    205.6968    112.89  .   Q     .         .         .  V      .
  18.917    206.4630    111.25  .   Q     .         .         .  V      .
  19.000    207.2185    109.70  .   Q     .         .         .   V     .
  19.083    207.9638    108.21  .   Q     .         .         .   V     .
  19.167    208.6992    106.78  .   Q     .         .         .   V     .
  19.250    209.4251    105.41  .   Q     .         .         .   V     .
  19.333    210.1420    104.09  .   Q     .         .         .   V     .
  19.417    210.8502    102.83  .   Q     .         .         .   V     .
  19.500    211.5501    101.62  .   Q     .         .         .   V     .
  19.583    212.2419    100.45  .   Q     .         .         .   V     .
  19.667    212.9259     99.32  .  Q      .         .         .   V     .
  19.750    213.6025     98.24  .  Q      .         .         .    V    .
  19.833    214.2718     97.19  .  Q      .         .         .    V    .
  19.917    214.9343     96.18  .  Q      .         .         .    V    .
  20.000    215.5900     95.21  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                         1205.0
            10%                          625.0
            20%                          135.0
            30%                           50.0
            40%                           40.0
            50%                           30.0
            60%                           25.0
            70%                           20.0
            80%                           15.0
            90%                           10.0


********************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   431.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 4 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

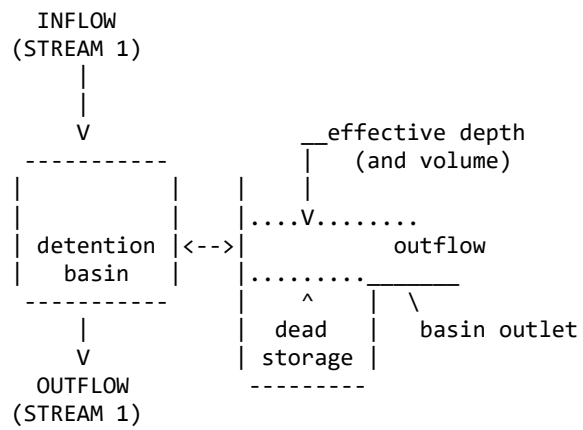
```
****************************************************************************
  FLOW PROCESS FROM NODE   431.00 TO NODE   431.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      300.0     600.0     900.0    1200.0
----------------------------------------------------------------------------
  15.000    133.4809    223.13  .      Q  .        V.         .         .
  15.083    135.0604    229.34  .      Q  .        V.         .         .
  15.167    136.6865    236.12  .      Q  .        V.         .         .
  15.250    138.3646    243.66  .       Q .         V         .         .
  15.333    140.1003    252.02  .       Q .         V         .         .
  15.417    141.8954    260.65  .       Q .         V         .         .
  15.500    143.7382    267.57  .       Q .         V         .         .
  15.583    145.6121    272.09  .        Q.         .V        .         .
  15.667    147.5155    276.38  .        Q.         .V        .         .
  15.750    149.4723    284.12  .        Q.         .V        .         .
  15.833    151.5384    300.00  .        Q.         . V       .         .
  15.917    153.8070    329.41  .         Q         . V       .         .
  16.000    156.4510    383.91  .         . Q       . V       .         .
  16.083    159.9561    508.94  .         .     Q   .  V      .         .
  16.167    165.0434    738.68  .         .         .   Q     .         .
  16.250    171.8785    992.46  .         .         .    V    .  Q      .
  16.333    179.4996   1106.58  .         .         .     V   .     Q   .
  16.417    186.6903   1044.09  .         .         .      V  .   Q     .
  16.500    192.2809    811.76  .         .         .      Q  .         .
  16.583    196.3660    593.15  .         .        Q.       V .         .
  16.667    199.4651    449.99  .         .   Q     .        V.         .
  16.750    201.9681    363.43  .         . Q       .        V.         .
  16.833    204.0793    306.56  .         Q         .        V.         .
  16.917    205.9523    271.95  .        Q.         .        V.         .
  17.000    207.7004    253.82  .       Q .         .         V         .
  17.083    209.3381    237.79  .      Q  .         .         V         .
  17.167    210.8514    219.74  .      Q  .         .         V         .
  17.250    212.2682    205.71  .     Q   .         .         V         .
  17.333    213.6074    194.46  .     Q   .         .         .V        .
  17.417    214.8864    185.71  .     Q   .         .         .V        .
  17.500    216.1141    178.25  .    Q    .         .         .V        .
  17.583    217.2978    171.87  .    Q    .         .         .V        .
  17.667    218.4432    166.31  .    Q    .         .         .V        .
  17.750    219.5546    161.38  .    Q    .         .         .V        .
  17.833    220.6355    156.95  .    Q    .         .         . V       .
  17.917    221.6886    152.92  .    Q    .         .         . V       .
  18.000    222.7162    149.21  .   Q     .         .         . V       .
  18.083    223.7206    145.84  .   Q     .         .         . V       .
  18.167    224.7052    142.97  .   Q     .         .         . V       .
  18.250    225.6738    140.64  .   Q     .         .         . V       .
  18.333    226.6291    138.70  .   Q     .         .         . V       .
  18.417    227.5721    136.93  .   Q     .         .         .  V      .
  18.500    228.5023    135.06  .   Q     .         .         .  V      .
  18.583    229.4189    133.09  .   Q     .         .         .  V      .
  18.667    230.3217    131.09  .   Q     .         .         .  V      .
  18.750    231.2111    129.13  .   Q     .         .         .  V      .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      300.0     600.0     900.0    1200.0
--------------------------------------------------------------------------------
  18.833    232.0873    127.22  .   Q     .         .         .  V      .
  18.917    232.9508    125.39  .   Q     .         .         .  V      .
  19.000    233.8023    123.64  .   Q     .         .         .   V     .
  19.083    234.6423    121.97  .   Q     .         .         .   V     .
  19.167    235.4713    120.36  .   Q     .         .         .   V     .
  19.250    236.2896    118.82  .  Q      .         .         .   V     .
  19.333    237.0977    117.34  .  Q      .         .         .   V     .
  19.417    237.8960    115.92  .  Q      .         .         .   V     .
  19.500    238.6850    114.55  .  Q      .         .         .   V     .
  19.583    239.4649    113.24  .  Q      .         .         .   V     .
  19.667    240.2361    111.98  .  Q      .         .         .   V     .
  19.750    240.9989    110.76  .  Q      .         .         .    V    .
  19.833    241.7536    109.58  .  Q      .         .         .    V    .
  19.917    242.5005    108.45  .  Q      .         .         .    V    .
  20.000    243.2398    107.35  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           605.0
            20%                           130.0
            30%                            50.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    91.00 TO NODE    91.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================
```




ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
  DEAD STORAGE(AF) =  0.000
  SPECIFIED DEAD STORAGE(AF) FILLED =  0.000
  SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =  0.000
  DETENTION BASIN CONSTANT LOSS RATE(CFS) =  0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

| INTERVAL NUMBER | DEPTH (FT) | OUTFLOW (CFS) | STORAGE (AF) |
|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.000 |
| 2 | 0.50 | 9.00 | 0.520 |
| 3 | 1.00 | 25.00 | 1.080 |
| 4 | 1.50 | 45.00 | 1.690 |
| 5 | 2.00 | 62.00 | 2.340 |
| 6 | 2.50 | 78.00 | 3.050 |
| 7 | 3.00 | 92.00 | 3.800 |
| 8 | 4.00 | 115.00 | 5.510 |
| 9 | 5.00 | 134.00 | 8.200 |
| 10 | 6.00 | 150.00 | 11.960 |
| 11 | 7.00 | 166.00 | 16.170 |
| 12 | 8.00 | 179.00 | 20.740 |
| 13 | 9.00 | 192.00 | 25.640 |
| 14 | 10.00 | 204.00 | 30.860 |
| 15 | 12.00 | 226.00 | 42.220 |
| 16 | 14.00 | 246.00 | 54.510 |
| 17 | 14.50 | 251.00 | 57.740 |
| 18 | 16.00 | 265.00 | 68.140 |
| 19 | 18.00 | 282.00 | 83.720 |

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 15.083 | 0.000 | 229.34 | 0.00 | 6.50 | 157.0 | 14.046 |
| 15.167 | 0.000 | 236.12 | 0.00 | 6.62 | 158.9 | 14.578 |
| 15.250 | 0.000 | 243.66 | 0.00 | 6.76 | 161.0 | 15.147 |
| 15.333 | 0.000 | 252.02 | 0.00 | 6.90 | 163.3 | 15.758 |
| 15.417 | 0.000 | 260.65 | 0.00 | 7.05 | 165.6 | 16.413 |
| 15.500 | 0.000 | 267.57 | 0.00 | 7.20 | 167.7 | 17.101 |
| 15.583 | 0.000 | 272.09 | 0.00 | 7.36 | 169.7 | 17.806 |
| 15.667 | 0.000 | 276.38 | 0.00 | 7.52 | 171.7 | 18.527 |
| 15.750 | 0.000 | 284.12 | 0.00 | 7.68 | 173.8 | 19.287 |
| 15.833 | 0.000 | 300.00 | 0.00 | 7.87 | 176.1 | 20.141 |
| 15.917 | 0.000 | 329.41 | 0.00 | 8.09 | 178.7 | 21.178 |
| 16.000 | 0.000 | 383.91 | 0.00 | 8.37 | 182.0 | 22.569 |
| 16.083 | 0.000 | 508.94 | 0.00 | 8.83 | 186.8 | 24.788 |
| 16.167 | 0.000 | 738.68 | 0.00 | 9.56 | 194.2 | 28.537 |
| 16.250 | 0.000 | 992.46 | 0.00 | 10.55 | 204.3 | 33.965 |
| 16.333 | 0.000 | 1106.58 | 0.00 | 11.63 | 216.0 | 40.099 |
| 16.417 | 0.000 | 1044.09 | 0.00 | 12.57 | 226.8 | 45.728 |
| 16.500 | 0.000 | 811.76 | 0.00 | 13.22 | 234.9 | 49.700 |
| 16.583 | 0.000 | 593.15 | 0.00 | 13.61 | 240.2 | 52.131 |
| 16.667 | 0.000 | 449.99 | 0.00 | 13.84 | 243.3 | 53.555 |
| 16.750 | 0.000 | 363.43 | 0.00 | 13.98 | 245.1 | 54.370 |
| 16.833 | 0.000 | 306.56 | 0.00 | 14.04 | 246.1 | 54.786 |
| 16.917 | 0.000 | 271.95 | 0.00 | 14.07 | 246.6 | 54.961 |
| 17.000 | 0.000 | 253.82 | 0.00 | 14.08 | 246.7 | 55.010 |
| 17.083 | 0.000 | 237.79 | 0.00 | 14.07 | 246.7 | 54.948 |
| 17.167 | 0.000 | 219.74 | 0.00 | 14.04 | 246.5 | 54.764 |
| 17.250 | 0.000 | 205.71 | 0.00 | 14.00 | 246.2 | 54.485 |
| 17.333 | 0.000 | 194.46 | 0.00 | 13.94 | 245.7 | 54.132 |
| 17.417 | 0.000 | 185.71 | 0.00 | 13.87 | 245.1 | 53.724 |
| 17.500 | 0.000 | 178.25 | 0.00 | 13.80 | 244.4 | 53.269 |
| 17.583 | 0.000 | 171.87 | 0.00 | 13.72 | 243.6 | 52.775 |
| 17.667 | 0.000 | 166.31 | 0.00 | 13.63 | 242.7 | 52.248 |
| 17.750 | 0.000 | 161.38 | 0.00 | 13.54 | 241.9 | 51.694 |
| 17.833 | 0.000 | 156.95 | 0.00 | 13.45 | 240.9 | 51.115 |
| 17.917 | 0.000 | 152.92 | 0.00 | 13.35 | 240.0 | 50.516 |
| 18.000 | 0.000 | 149.21 | 0.00 | 13.25 | 239.0 | 49.897 |
| 18.083 | 0.000 | 145.84 | 0.00 | 13.15 | 238.0 | 49.263 |
| 18.167 | 0.000 | 142.97 | 0.00 | 13.04 | 236.9 | 48.616 |
| 18.250 | 0.000 | 140.64 | 0.00 | 12.93 | 235.9 | 47.960 |
| 18.333 | 0.000 | 138.70 | 0.00 | 12.83 | 234.8 | 47.298 |
| 18.417 | 0.000 | 136.93 | 0.00 | 12.72 | 233.7 | 46.631 |
| 18.500 | 0.000 | 135.06 | 0.00 | 12.61 | 232.6 | 45.959 |
| 18.583 | 0.000 | 133.09 | 0.00 | 12.50 | 231.5 | 45.281 |
| 18.667 | 0.000 | 131.09 | 0.00 | 12.39 | 230.4 | 44.597 |
| 18.750 | 0.000 | 129.13 | 0.00 | 12.27 | 229.3 | 43.907 |
| 18.833 | 0.000 | 127.22 | 0.00 | 12.16 | 228.2 | 43.212 |
| 18.917 | 0.000 | 125.39 | 0.00 | 12.05 | 227.0 | 42.512 |
| 19.000 | 0.000 | 123.64 | 0.00 | 11.93 | 225.8 | 41.808 |
| 19.083 | 0.000 | 121.97 | 0.00 | 11.80 | 224.5 | 41.102 |
| 19.167 | 0.000 | 120.36 | 0.00 | 11.68 | 223.1 | 40.394 |

← PEAK OUTFLOW

$Q_{100} = 246.7$ cfs

$V_{100} = 55.0$ AC-FT

ELEV = 1412'
+ 14.1'
1426.1'

0.5' FREEBOARD

SPILLWAY = 1426.6'

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 19.250 | 0.000 | 118.82 | 0.00 | 11.55 | 221.8 | 39.685 |
| 19.333 | 0.000 | 117.34 | 0.00 | 11.43 | 220.4 | 38.975 |
| 19.417 | 0.000 | 115.92 | 0.00 | 11.30 | 219.0 | 38.265 |
| 19.500 | 0.000 | 114.55 | 0.00 | 11.18 | 217.7 | 37.555 |
| 19.583 | 0.000 | 113.24 | 0.00 | 11.05 | 216.3 | 36.845 |
| 19.667 | 0.000 | 111.98 | 0.00 | 10.93 | 214.9 | 36.136 |
| 19.750 | 0.000 | 110.76 | 0.00 | 10.80 | 213.5 | 35.429 |
| 19.833 | 0.000 | 109.58 | 0.00 | 10.68 | 212.2 | 34.722 |
| 19.917 | 0.000 | 108.45 | 0.00 | 10.56 | 210.8 | 34.017 |
| 20.000 | 0.000 | 107.35 | 0.00 | 10.43 | 209.4 | 33.314 |
| 20.083 | 0.000 | 106.29 | 0.00 | 10.31 | 208.1 | 32.613 |
| 20.167 | 0.000 | 105.26 | 0.00 | 10.19 | 206.7 | 31.914 |
| 20.250 | 0.000 | 104.27 | 0.00 | 10.06 | 205.4 | 31.218 |
| 20.333 | 0.000 | 103.30 | 0.00 | 9.94 | 204.0 | 30.525 |
| 20.417 | 0.000 | 102.37 | 0.00 | 9.80 | 202.4 | 29.836 |
| 20.500 | 0.000 | 101.46 | 0.00 | 9.67 | 200.9 | 29.151 |
| 20.583 | 0.000 | 100.57 | 0.00 | 9.54 | 199.3 | 28.471 |
| 20.667 | 0.000 | 99.72 | 0.00 | 9.41 | 197.7 | 27.796 |
| 20.750 | 0.000 | 98.88 | 0.00 | 9.28 | 196.2 | 27.126 |
| 20.833 | 0.000 | 98.07 | 0.00 | 9.16 | 194.7 | 26.461 |
| 20.917 | 0.000 | 97.28 | 0.00 | 9.03 | 193.1 | 25.801 |
| 21.000 | 0.000 | 96.52 | 0.00 | 8.90 | 191.5 | 25.146 |
| 21.083 | 0.000 | 95.77 | 0.00 | 8.77 | 189.8 | 24.499 |
| 21.167 | 0.000 | 95.04 | 0.00 | 8.64 | 188.1 | 23.858 |
| 21.250 | 0.000 | 94.32 | 0.00 | 8.51 | 186.4 | 23.223 |
| 21.333 | 0.000 | 93.63 | 0.00 | 8.38 | 184.8 | 22.596 |
| 21.417 | 0.000 | 92.95 | 0.00 | 8.25 | 183.1 | 21.975 |
| 21.500 | 0.000 | 92.29 | 0.00 | 8.13 | 181.5 | 21.361 |
| 21.583 | 0.000 | 91.64 | 0.00 | 8.00 | 179.8 | 20.753 |
| 21.667 | 0.000 | 91.01 | 0.00 | 7.87 | 178.2 | 20.153 |
| 21.750 | 0.000 | 90.39 | 0.00 | 7.74 | 176.5 | 19.560 |
| 21.833 | 0.000 | 89.79 | 0.00 | 7.61 | 174.8 | 18.974 |
| 21.917 | 0.000 | 89.20 | 0.00 | 7.49 | 173.2 | 18.396 |
| 22.000 | 0.000 | 88.62 | 0.00 | 7.36 | 171.5 | 17.825 |
| 22.083 | 0.000 | 88.05 | 0.00 | 7.24 | 169.9 | 17.262 |
| 22.167 | 0.000 | 87.50 | 0.00 | 7.12 | 168.3 | 16.705 |
| 22.250 | 0.000 | 86.96 | 0.00 | 7.00 | 166.7 | 16.156 |
| 22.333 | 0.000 | 86.43 | 0.00 | 6.87 | 164.9 | 15.615 |
| 22.417 | 0.000 | 85.90 | 0.00 | 6.74 | 162.9 | 15.085 |
| 22.500 | 0.000 | 85.39 | 0.00 | 6.62 | 160.9 | 14.565 |
| 22.583 | 0.000 | 84.89 | 0.00 | 6.50 | 158.9 | 14.055 |
| 22.667 | 0.000 | 84.40 | 0.00 | 6.38 | 157.0 | 13.555 |
| 22.750 | 0.000 | 83.92 | 0.00 | 6.26 | 155.1 | 13.064 |
| 22.833 | 0.000 | 83.45 | 0.00 | 6.15 | 153.3 | 12.584 |
| 22.917 | 0.000 | 82.98 | 0.00 | 6.04 | 151.5 | 12.112 |
| 23.000 | 0.000 | 82.52 | 0.00 | 5.92 | 149.6 | 11.650 |
| 23.083 | 0.000 | 82.08 | 0.00 | 5.80 | 147.7 | 11.198 |
| 23.167 | 0.000 | 81.64 | 0.00 | 5.68 | 145.8 | 10.756 |
| 23.250 | 0.000 | 81.20 | 0.00 | 5.56 | 144.0 | 10.323 |
| 23.333 | 0.000 | 80.78 | 0.00 | 5.45 | 142.1 | 9.901 |

```
================================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)

           CLOCK                                                  MEAN
            TIME  DEAD-STORAGE  INFLOW    LOSS   EFFECTIVE OUTFLOW  EFFECTIVE
           (HRS)   FILLED(AF)    (CFS)    (CFS)  DEPTH(FT)  (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
          23.417        0.000    80.36     0.00      5.34    140.4      9.488
          23.500        0.000    79.95     0.00      5.23    138.6      9.084
          23.583        0.000    79.55     0.00      5.13    136.9      8.688
          23.667        0.000    79.15     0.00      5.03    135.3      8.302
          23.750        0.000    78.76     0.00      4.90    133.3      7.927
          23.833        0.000    78.38     0.00      4.76    130.8      7.566
          23.917        0.000    78.00     0.00      4.64    128.3      7.219
--------------------------------------------------------------------------------
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =    274.884 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =    274.884 AF
    LOSS    VOLUME =      0.000 AF
================================================================================

  END OF FLOODSCx ROUTING ANALYSIS
```

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# Flood Routing Analysis
# Two-Day (48-Hour) Event

```
**************************************************************************

            F L O O D    R O U T I N G    A N A L Y S I S
         USING COUNTY HYDROLOGY MANUAL OF SAN BERNARDINO(1986)
        (c) Copyright 1989-2015 Advanced Engineering Software (aes)
            Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* 15th Street Basin Modified - 2 Day Storm - Second Day Event            *
* 9' x 1.5' Opening                                                      *
* File: E15CR22                                                          *
 **************************************************************************

  FILE NAME: C:\aes2015\hydrosft\floodX\E15CR2.fld
  TIME/DATE OF STUDY: 10:56 07/31/2018



**************************************************************************
  FLOW PROCESS FROM NODE     9.00 TO NODE    81.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =     379.090 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.320 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.390
         LOW LOSS FRACTION = 0.365
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.18
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.42
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.58
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.07
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.56
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.43

         *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.980
          30-MINUTE FACTOR = 0.980
           1-HOUR FACTOR = 0.980
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000
```

```
          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  26.042


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 1.572                72.053
        2                 8.065               297.710
        3                22.451               659.544
        4                41.662               880.717
        5                63.212               988.028
        6                79.350               739.862
        7                88.790               432.771
        8                94.038               240.601
        9                96.928               132.516
       10                98.232                59.761
       11                98.721                22.406
       12                99.209                22.385
       13                99.684                21.759
       14                99.921                10.880
       15               100.000                 3.627


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      38.5428
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      69.7776
--------------------------------------------------------------------------------
```

==========

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 75.0 150.0 225.0 300.0 |
|---|---|---|---|
| 15.000 | 34.4248 | 58.03 | . Q . V. . . |
| 15.083 | 34.8353 | 59.60 | . Q . V. . . |
| 15.167 | 35.2575 | 61.31 | . Q . V . . |
| 15.250 | 35.6928 | 63.21 | . Q . V . . |
| 15.333 | 36.1425 | 65.29 | . Q . V . . |
| 15.417 | 36.6069 | 67.43 | . Q . V . . |
| 15.500 | 37.0829 | 69.11 | . Q. .V . . |
| 15.583 | 37.5654 | 70.06 | . Q. .V . . |
| 15.667 | 38.0530 | 70.80 | . Q. .V . . |
| 15.750 | 38.5494 | 72.07 | . Q. . V . . |
| 15.833 | 39.0681 | 75.32 | . Q . V . . |
| 15.917 | 39.6311 | 81.74 | . Q . V . . |
| 16.000 | 40.2668 | 92.31 | . . Q . V . . |
| 16.083 | 41.0644 | 115.81 | . . Q . V . . |
| 16.167 | 42.1532 | 158.09 | . . .Q V . . |
| 16.250 | 43.6067 | 211.05 | . . . V Q . . |
| 16.333 | 45.2544 | 239.24 | . . . V .Q . |
| 16.417 | 46.9243 | 242.47 | . . . V . Q . |
| 16.500 | 48.3007 | 199.86 | . . . QV . . |
| 16.583 | 49.3363 | 150.37 | . . Q V . . |
| 16.667 | 50.1383 | 116.44 | . . Q . V . . |
| 16.750 | 50.7952 | 95.38 | . . Q . V. . |
| 16.833 | 51.3500 | 80.56 | . Q . V. . |
| 16.917 | 51.8404 | 71.21 | . Q. . V. . |
| 17.000 | 52.3013 | 66.92 | . Q . . V. . |
| 17.083 | 52.7359 | 63.09 | . Q . . V . |
| 17.167 | 53.1382 | 58.42 | . Q . . V . |
| 17.250 | 53.5125 | 54.36 | . Q . . V . |
| 17.333 | 53.8642 | 51.06 | . Q . . V . |
| 17.417 | 54.1980 | 48.47 | . Q . . .V . |
| 17.500 | 54.5167 | 46.27 | . Q . . .V . |
| 17.583 | 54.8228 | 44.45 | . Q . . .V . |
| 17.667 | 55.1182 | 42.89 | . Q . . .V . |
| 17.750 | 55.4043 | 41.54 | . Q . . .V . |
| 17.833 | 55.6821 | 40.34 | . Q . . .V . |
| 17.917 | 55.9526 | 39.27 | . Q . . . V . |
| 18.000 | 56.2163 | 38.28 | . Q . . . V . |
| 18.083 | 56.4738 | 37.40 | . Q . . . V . |
| 18.167 | 56.7263 | 36.66 | . Q . . . V . |
| 18.250 | 56.9749 | 36.10 | . Q . . . V . |
| 18.333 | 57.2206 | 35.67 | . Q . . . V . |
| 18.417 | 57.4639 | 35.33 | . Q . . . V . |
| 18.500 | 57.7045 | 34.94 | . Q . . . V . |
| 18.583 | 57.9420 | 34.49 | . Q . . . V . |
| 18.667 | 58.1762 | 34.00 | . Q . . . V . |
| 18.750 | 58.4070 | 33.51 | . Q . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       75.0     150.0     225.0     300.0
--------------------------------------------------------------------------------
  18.833     58.6344     33.02  .   Q     .         .         .  V      .
  18.917     58.8586     32.55  .   Q     .         .         .  V      .
  19.000     59.0797     32.10  .   Q     .         .         .  V      .
  19.083     59.2978     31.67  .   Q     .         .         .  V      .
  19.167     59.5130     31.25  .   Q     .         .         .   V     .
  19.250     59.7254     30.85  .   Q     .         .         .   V     .
  19.333     59.9352     30.46  .   Q     .         .         .   V     .
  19.417     60.1425     30.09  .   Q     .         .         .   V     .
  19.500     60.3473     29.74  .  Q      .         .         .   V     .
  19.583     60.5498     29.40  .  Q      .         .         .   V     .
  19.667     60.7500     29.07  .  Q      .         .         .   V     .
  19.750     60.9480     28.75  .  Q      .         .         .   V     .
  19.833     61.1440     28.45  .  Q      .         .         .    V    .
  19.917     61.3378     28.15  .  Q      .         .         .    V    .
  20.000     61.5298     27.87  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           890.0
            20%                           180.0
            30%                            65.0
            40%                            40.0
            50%                            30.0
            60%                            30.0
            70%                            20.0
            80%                            20.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   109.00 TO NODE   251.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #2)

         WATERSHED AREA =      60.740 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.260 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.380
         LOW LOSS FRACTION = 0.358
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.18
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.42
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.58
```

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 SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.07
 SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.56
 SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.43

 *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
   5-MINUTE FACTOR = 0.980
  30-MINUTE FACTOR = 0.980
   1-HOUR FACTOR = 0.980
   3-HOUR FACTOR = 1.000
   6-HOUR FACTOR = 1.000
  24-HOUR FACTOR = 1.000

 UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
 UNIT INTERVAL PERCENTAGE OF LAG-TIME =  32.051


 RUNOFF HYDROGRAPH LISTING LIMITS:
 MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
 MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                2.050                15.056
        2               12.541                77.066
        3               32.902               149.568
        4               59.287               193.817
        5               79.698               149.934
        6               90.409                78.679
        7               95.683                38.739
        8               97.996                16.991
        9               98.702                 5.189
       10               99.294                 4.352
       11               99.718                 3.110
       12               99.929                 1.555
       13              100.000                 0.518


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       6.0561
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      11.2996
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 12.5 25.0 37.5 50.0 |
|---|---|---|---|
| 15.000 | 5.6259 | 9.58 | . Q . V. . . |
| 15.083 | 5.6938 | 9.85 | . Q . V . . |
| 15.167 | 5.7636 | 10.14 | . Q . V . . |
| 15.250 | 5.8357 | 10.47 | . Q . V . . |
| 15.333 | 5.9104 | 10.84 | . Q . V . . |
| 15.417 | 5.9875 | 11.20 | . Q . .V . . |
| 15.500 | 6.0661 | 11.42 | . Q. .V . . |
| 15.583 | 6.1451 | 11.47 | . Q. .V . . |
| 15.667 | 6.2242 | 11.49 | . Q. . V . . |
| 15.750 | 6.3056 | 11.81 | . Q. . V . . |
| 15.833 | 6.3926 | 12.63 | . Q . V . . |
| 15.917 | 6.4889 | 13.99 | . .Q . V . . |
| 16.000 | 6.6007 | 16.23 | . . Q . V . . |
| 16.083 | 6.7460 | 21.09 | . . Q . V . . |
| 16.167 | 6.9606 | 31.16 | . . . Q . . |
| 16.250 | 7.2421 | 40.88 | . . . V . Q . |
| 16.333 | 7.5501 | 44.72 | . . . V . Q . |
| 16.417 | 7.8045 | 36.95 | . . . V Q. . |
| 16.500 | 7.9829 | 25.90 | . . Q V . . |
| 16.583 | 8.1136 | 18.98 | . . Q . V . . |
| 16.667 | 8.2168 | 14.99 | . .Q . V. . |
| 16.750 | 8.3039 | 12.64 | . Q . V. . |
| 16.833 | 8.3844 | 11.69 | . Q. . V. . |
| 16.917 | 8.4590 | 10.83 | . Q . . V. . |
| 17.000 | 8.5281 | 10.03 | . Q . . V . |
| 17.083 | 8.5926 | 9.36 | . Q . . V . |
| 17.167 | 8.6533 | 8.82 | . Q . . V . |
| 17.250 | 8.7108 | 8.35 | . Q . . V . |
| 17.333 | 8.7653 | 7.91 | . Q . . .V . |
| 17.417 | 8.8172 | 7.53 | . Q . . .V . |
| 17.500 | 8.8670 | 7.23 | . Q . . .V . |
| 17.583 | 8.9150 | 6.97 | . Q . . .V . |
| 17.667 | 8.9615 | 6.75 | . Q . . .V . |
| 17.750 | 9.0067 | 6.56 | . Q . . .V . |
| 17.833 | 9.0507 | 6.39 | . Q . . . V . |
| 17.917 | 9.0936 | 6.23 | . Q . . . V . |
| 18.000 | 9.1354 | 6.08 | . Q . . . V . |
| 18.083 | 9.1764 | 5.95 | . Q . . . V . |
| 18.167 | 9.2166 | 5.85 | . Q . . . V . |
| 18.250 | 9.2564 | 5.78 | . Q . . . V . |
| 18.333 | 9.2959 | 5.73 | . Q . . . V . |
| 18.417 | 9.3350 | 5.68 | . Q . . . . V . |
| 18.500 | 9.3737 | 5.61 | . Q . . . . V . |
| 18.583 | 9.4117 | 5.53 | . Q . . . . V . |
| 18.667 | 9.4493 | 5.45 | . Q . . . . V . |
| 18.750 | 9.4862 | 5.37 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       12.5      25.0      37.5      50.0
--------------------------------------------------------------------------------
  18.833      9.5226      5.29  .   Q     .         .         .  V      .
  18.917      9.5586      5.22  .   Q     .         .         .  V      .
  19.000      9.5940      5.14  .   Q     .         .         .  V      .
  19.083      9.6290      5.08  .   Q     .         .         .   V     .
  19.167      9.6635      5.01  .   Q     .         .         .   V     .
  19.250      9.6975      4.95  .  Q      .         .         .   V     .
  19.333      9.7312      4.89  .  Q      .         .         .   V     .
  19.417      9.7645      4.83  .  Q      .         .         .   V     .
  19.500      9.7973      4.77  .  Q      .         .         .   V     .
  19.583      9.8298      4.72  .  Q      .         .         .   V     .
  19.667      9.8620      4.67  .  Q      .         .         .   V     .
  19.750      9.8938      4.62  .  Q      .         .         .    V    .
  19.833      9.9253      4.57  .  Q      .         .         .    V    .
  19.917      9.9564      4.52  .  Q      .         .         .    V    .
  20.000      9.9873      4.48  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
              0%                        1205.0
             10%                         660.0
             20%                         140.0
             30%                          50.0
             40%                          35.0
             50%                          25.0
             60%                          20.0
             70%                          15.0
             80%                          15.0
             90%                          10.0


********************************************************************************
  FLOW PROCESS FROM NODE   309.00 TO NODE   361.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #3)

         WATERSHED AREA =      81.340 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.300 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.410
         LOW LOSS FRACTION = 0.378
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.18
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.42
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.58
```

```
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.07
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.56
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.43

         *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.980
          30-MINUTE FACTOR = 0.980
           1-HOUR FACTOR = 0.980
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  27.778


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 1.701                16.730
        2                 9.283                74.585
        3                25.290               157.462
        4                46.738               210.990
        5                68.920               218.201
        6                83.414               142.577
        7                91.365                78.214
        8                95.710                42.750
        9                97.845                21.003
       10                98.542                 6.849
       11                99.063                 5.124
       12                99.583                 5.124
       13               100.000                 4.099


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       8.5680
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      14.6741
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 15.0 30.0 45.0 60.0 |
|---|---|---|---|
| 15.000 | 7.2565 | 12.27 | . Q . V. . . |
| 15.083 | 7.3433 | 12.61 | . Q . V . . |
| 15.167 | 7.4327 | 12.97 | . Q . V . . |
| 15.250 | 7.5249 | 13.38 | . Q . V . . |
| 15.333 | 7.6201 | 13.83 | . Q. V . . |
| 15.417 | 7.7185 | 14.29 | . Q. .V . . |
| 15.500 | 7.8193 | 14.63 | . Q. .V . . |
| 15.583 | 7.9211 | 14.79 | . Q. .V . . |
| 15.667 | 8.0238 | 14.91 | . Q. .V . . |
| 15.750 | 8.1284 | 15.19 | . Q . V . . |
| 15.833 | 8.2385 | 15.99 | . Q . V . . |
| 15.917 | 8.3588 | 17.47 | . .Q . V . . |
| 16.000 | 8.4958 | 19.89 | . . Q . V . . |
| 16.083 | 8.6697 | 25.26 | . . Q . V . . |
| 16.167 | 8.9137 | 35.42 | . . . QV . . |
| 16.250 | 9.2384 | 47.15 | . . . V .Q . |
| 16.333 | 9.6051 | 53.24 | . . . V . Q . |
| 16.417 | 9.9599 | 51.52 | . . . V . Q . |
| 16.500 | 10.2332 | 39.69 | . . . QV . . |
| 16.583 | 10.4351 | 29.31 | . . Q. V . . |
| 16.667 | 10.5928 | 22.89 | . . Q . V . . |
| 16.750 | 10.7221 | 18.78 | . . Q . V. . |
| 16.833 | 10.8319 | 15.95 | . Q . V. . |
| 16.917 | 10.9334 | 14.73 | . Q. . V. . |
| 17.000 | 11.0288 | 13.86 | . Q. . V . |
| 17.083 | 11.1181 | 12.96 | . Q . . V . |
| 17.167 | 11.1993 | 11.80 | . Q . . V . |
| 17.250 | 11.2761 | 11.15 | . Q . . V . |
| 17.333 | 11.3489 | 10.57 | . Q . . V . |
| 17.417 | 11.4180 | 10.04 | . Q . . .V . |
| 17.500 | 11.4842 | 9.60 | . Q . . .V . |
| 17.583 | 11.5478 | 9.24 | . Q . . .V . |
| 17.667 | 11.6092 | 8.92 | . Q . . .V . |
| 17.750 | 11.6688 | 8.65 | . Q . . .V . |
| 17.833 | 11.7268 | 8.41 | . Q . . .V . |
| 17.917 | 11.7832 | 8.19 | . Q . . . V . |
| 18.000 | 11.8382 | 7.99 | . Q . . . V . |
| 18.083 | 11.8920 | 7.81 | . Q . . . V . |
| 18.167 | 11.9447 | 7.66 | . Q . . . V . |
| 18.250 | 11.9968 | 7.55 | . Q . . . V . |
| 18.333 | 12.0482 | 7.47 | . Q . . . V . |
| 18.417 | 12.0992 | 7.41 | . Q . . . V . |
| 18.500 | 12.1497 | 7.32 | . Q . . . V . |
| 18.583 | 12.1994 | 7.22 | . Q . . . V . |
| 18.667 | 12.2485 | 7.12 | . Q . . . V . |
| 18.750 | 12.2968 | 7.02 | . Q . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       15.0      30.0      45.0      60.0
--------------------------------------------------------------------------------
  18.833     12.3444      6.91  .   Q     .         .         .  V      .
  18.917     12.3913      6.82  .   Q     .         .         .  V      .
  19.000     12.4376      6.72  .   Q     .         .         .  V      .
  19.083     12.4833      6.63  .   Q     .         .         .   V     .
  19.167     12.5284      6.55  .   Q     .         .         .   V     .
  19.250     12.5729      6.46  .   Q     .         .         .   V     .
  19.333     12.6168      6.38  .   Q     .         .         .   V     .
  19.417     12.6603      6.30  .   Q     .         .         .   V     .
  19.500     12.7032      6.23  .   Q     .         .         .   V     .
  19.583     12.7456      6.16  .   Q     .         .         .   V     .
  19.667     12.7876      6.09  .   Q     .         .         .   V     .
  19.750     12.8291      6.03  .   Q     .         .         .   V     .
  19.833     12.8701      5.96  .  Q      .         .         .    V    .
  19.917     12.9108      5.90  .  Q      .         .         .    V    .
  20.000     12.9510      5.84  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           805.0
            20%                           170.0
            30%                            60.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0



********************************************************************************
  FLOW PROCESS FROM NODE   409.00 TO NODE   431.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #4)

         WATERSHED AREA =      62.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.240 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.340
         LOW LOSS FRACTION = 0.322
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.18
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.42
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.58
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.07
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.56
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.43

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  34.722


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


=============================================================================
                      UNIT HYDROGRAPH DETERMINATION

-----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
-----------------------------------------------------------------------------
        1                 2.308                17.499
        2                14.779                94.568
        3                38.225               177.789
        4                66.233               212.371
        5                84.561               138.980
        6                93.250                65.884
        7                97.213                30.057
        8                98.477                 9.578
        9                99.128                 4.936
       10                99.651                 3.969
       11                99.913                 1.985
       12               100.000                 0.662


-----------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       5.6221
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      12.2933
-----------------------------------------------------------------------------
```

```
================================================================================

                    2 4 - H O U R    S T O R M
                 R U N O F F    H Y D R O G R A P H

================================================================================
             HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       12.5      25.0      37.5      50.0
--------------------------------------------------------------------------------
  15.000      6.1514     10.51  .       Q .         V         .         .
  15.083      6.2259     10.81  .       Q .         V         .         .
  15.167      6.3026     11.14  .       Q .         V         .         .
  15.250      6.3818     11.50  .        Q.         V         .         .
  15.333      6.4638     11.92  .        Q.         .V        .         .
  15.417      6.5486     12.31  .        Q.         .V        .         .
  15.500      6.6349     12.52  .         Q         .V        .         .
  15.583      6.7210     12.51  .         Q         .V        .         .
  15.667      6.8073     12.52  .         Q         . V       .         .
  15.750      6.8965     12.96  .         Q         . V       .         .
  15.833      6.9929     13.99  .         .Q        . V       .         .
  15.917      7.1003     15.60  .         . Q       .  V      .         .
  16.000      7.2261     18.27  .         .   Q     .  V      .         .
  16.083      7.3915     24.02  .         .       Q.   V      .         .
  16.167      7.6411     36.23  .         .         .   V   Q .         .
  16.250      7.9644     46.95  .         .         .    V    .      Q  .
  16.333      8.3010     48.87  .         .         .      V  .        Q.
  16.417      8.5559     37.00  .         .         .      V Q.         .
  16.500      8.7298     25.26  .         .       Q       V .         .
  16.583      8.8587     18.71  .         .   Q     .       V .         .
  16.667      8.9618     14.97  .         .Q        .        V.         .
  16.750      9.0542     13.41  .         Q         .        V.         .
  16.833      9.1397     12.41  .        Q.         .        V.         .
  16.917      9.2184     11.43  .        Q.         .        V.         .
  17.000      9.2915     10.62  .       Q .         .         V         .
  17.083      9.3603      9.99  .      Q  .         .         V         .
  17.167      9.4255      9.48  .      Q  .         .         V         .
  17.250      9.4873      8.97  .      Q  .         .         V         .
  17.333      9.5459      8.50  .     Q   .         .         .V        .
  17.417      9.6017      8.10  .     Q   .         .         .V        .
  17.500      9.6553      7.79  .     Q   .         .         .V        .
  17.583      9.7072      7.53  .     Q   .         .         .V        .
  17.667      9.7575      7.30  .    Q    .         .         .V        .
  17.750      9.8064      7.10  .    Q    .         .         .V        .
  17.833      9.8540      6.91  .    Q    .         .         . V       .
  17.917      9.9004      6.74  .    Q    .         .         . V       .
  18.000      9.9457      6.58  .    Q    .         .         . V       .
  18.083      9.9901      6.44  .    Q    .         .         . V       .
  18.167     10.0338      6.34  .    Q    .         .         . V       .
  18.250     10.0771      6.28  .    Q    .         .         . V       .
  18.333     10.1200      6.24  .   Q     .         .         . V       .
  18.417     10.1625      6.18  .   Q     .         .         .  V      .
  18.500     10.2045      6.09  .   Q     .         .         .  V      .
  18.583     10.2459      6.01  .   Q     .         .         .  V      .
  18.667     10.2866      5.92  .   Q     .         .         .  V      .
  18.750     10.3268      5.83  .   Q     .         .         .  V      .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       12.5      25.0      37.5      50.0
--------------------------------------------------------------------------------
  18.833     10.3663      5.75  .   Q     .         .         .  V      .
  18.917     10.4053      5.66  .   Q     .         .         .  V      .
  19.000     10.4438      5.59  .   Q     .         .         .  V      .
  19.083     10.4818      5.51  .   Q     .         .         .   V     .
  19.167     10.5193      5.44  .   Q     .         .         .   V     .
  19.250     10.5563      5.38  .   Q     .         .         .   V     .
  19.333     10.5929      5.31  .   Q     .         .         .   V     .
  19.417     10.6291      5.25  .   Q     .         .         .   V     .
  19.500     10.6648      5.19  .   Q     .         .         .   V     .
  19.583     10.7001      5.13  .   Q     .         .         .   V     .
  19.667     10.7351      5.07  .   Q     .         .         .   V     .
  19.750     10.7696      5.02  .   Q     .         .         .    V    .
  19.833     10.8039      4.97  .  Q      .         .         .    V    .
  19.917     10.8377      4.92  .  Q      .         .         .    V    .
  20.000     10.8713      4.87  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           655.0
            20%                           140.0
            30%                            50.0
            40%                            30.0
            50%                            25.0
            60%                            20.0
            70%                            20.0
            80%                            10.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE    81.00 TO NODE   251.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 2 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   251.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       75.0     150.0     225.0     300.0
----------------------------------------------------------------------------
  15.000     40.0508     67.61  .        Q.        V.          .         .
  15.083     40.5291     69.45  .        Q.        V.          .         .
  15.167     41.0212     71.45  .        Q.         V          .         .
  15.250     41.5286     73.67  .        Q.         V          .         .
  15.333     42.0529     76.13  .         Q         V          .         .
  15.417     42.5944     78.63  .         Q         .V         .         .
  15.500     43.1490     80.53  .         Q         .V         .         .
  15.583     43.7105     81.53  .         Q         .V         .         .
  15.667     44.2773     82.29  .         Q         .V         .         .
  15.750     44.8549     83.88  .         .Q        . V        .         .
  15.833     45.4607     87.96  .         .Q        . V        .         .
  15.917     46.1200     95.73  .         . Q       . V        .         .
  16.000     46.8675    108.54  .         .   Q     .  V       .         .
  16.083     47.8103    136.90  .         .       Q .  V       .         .
  16.167     49.1137    189.25  .         .         .   VQ     .         .
  16.250     50.8488    251.93  .         .         .    V     .  Q      .
  16.333     52.8044    283.96  .         .         .     V    .      Q  .
  16.417     54.7288    279.42  .         .         .      V   .      Q  .
  16.500     56.2836    225.76  .         .         .      V  Q         .
  16.583     57.4499    169.35  .         .         . Q     V .         .
  16.667     58.3551    131.43  .         .      Q  .       V .         .
  16.750     59.0991    108.03  .         .   Q     .        V.         .
  16.833     59.7344     92.26  .         . Q       .        V.         .
  16.917     60.2994     82.04  .         Q         .        V.         .
  17.000     60.8294     76.95  .         Q         .         V         .
  17.083     61.3284     72.46  .        Q.         .         V         .
  17.167     61.7915     67.23  .       Q .         .         V         .
  17.250     62.2234     62.71  .       Q .         .         V         .
  17.333     62.6295     58.97  .      Q  .         .         V         .
  17.417     63.0152     56.00  .      Q  .         .         .V        .
  17.500     63.3837     53.50  .      Q  .         .         .V        .
  17.583     63.7378     51.42  .     Q   .         .         .V        .
  17.667     64.0797     49.64  .     Q   .         .         .V        .
  17.750     64.4110     48.10  .     Q   .         .         .V        .
  17.833     64.7328     46.73  .     Q   .         .         .V        .
  17.917     65.0462     45.50  .     Q   .         .         . V       .
  18.000     65.3517     44.36  .    Q    .         .         . V       .
  18.083     65.6502     43.34  .    Q    .         .         . V       .
  18.167     65.9429     42.50  .    Q    .         .         . V       .
  18.250     66.2313     41.88  .    Q    .         .         . V       .
  18.333     66.5165     41.41  .    Q    .         .         . V       .
  18.417     66.7989     41.01  .    Q    .         .         . V       .
  18.500     67.0782     40.55  .    Q    .         .         .  V      .
  18.583     67.3538     40.02  .    Q    .         .         .  V      .
  18.667     67.6255     39.45  .    Q    .         .         .  V      .
  18.750     67.8932     38.88  .    Q    .         .         .  V      .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       75.0     150.0     225.0     300.0
--------------------------------------------------------------------------------
  18.833     68.1571     38.31  .    Q    .         .         .  V      .
  18.917     68.4172     37.76  .    Q    .         .         .  V      .
  19.000     68.6737     37.24  .   Q     .         .         .  V      .
  19.083     68.9267     36.74  .   Q     .         .         .   V     .
  19.167     69.1764     36.26  .   Q     .         .         .   V     .
  19.250     69.4230     35.80  .   Q     .         .         .   V     .
  19.333     69.6664     35.35  .   Q     .         .         .   V     .
  19.417     69.9069     34.92  .   Q     .         .         .   V     .
  19.500     70.1446     34.51  .   Q     .         .         .   V     .
  19.583     70.3796     34.12  .   Q     .         .         .   V     .
  19.667     70.6120     33.74  .   Q     .         .         .   V     .
  19.750     70.8418     33.37  .   Q     .         .         .   V     .
  19.833     71.0692     33.02  .   Q     .         .         .    V    .
  19.917     71.2943     32.68  .   Q     .         .         .    V    .
  20.000     71.5171     32.35  .   Q     .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           875.0
            20%                           180.0
            30%                            65.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   361.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 3 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   361.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      100.0     200.0     300.0     400.0
----------------------------------------------------------------------------
  15.000     47.3073     79.88  .      Q  .        V.          .         .
  15.083     47.8724     82.06  .       Q .        V.          .         .
  15.167     48.4539     84.42  .       Q .         V          .         .
  15.250     49.0534     87.06  .       Q .         V          .         .
  15.333     49.6730     89.96  .       Q .         V          .         .
  15.417     50.3129     92.92  .        Q.         .V         .         .
  15.500     50.9683     95.16  .        Q.         .V         .         .
  15.583     51.6317     96.33  .        Q.         .V         .         .
  15.667     52.3011     97.20  .        Q.         .V         .         .
  15.750     52.9833     99.06  .        Q.         . V        .         .
  15.833     53.6992    103.94  .         Q         . V        .         .
  15.917     54.4788    113.20  .         .Q        . V        .         .
  16.000     55.3633    128.43  .         . Q       .  V       .         .
  16.083     56.4801    162.16  .         .     Q   .  V       .         .
  16.167     58.0274    224.67  .         .         . Q V      .         .
  16.250     60.0872    299.08  .         .         .    V   Q.         .
  16.333     62.4095    337.20  .         .         .     V   .  Q       .
  16.417     64.6887    330.93  .         .         .      V  .  Q       .
  16.500     66.5168    265.44  .         .         .     QV  .          .
  16.583     67.8850    198.66  .         .        Q.       V .          .
  16.667     68.9478    154.33  .         .    Q    .       V .          .
  16.750     69.8211    126.80  .         . Q       .        V.          .
  16.833     70.5663    108.20  .         Q         .        V.          .
  16.917     71.2328     96.77  .        Q.         .        V.          .
  17.000     71.8583     90.82  .        Q.         .         V          .
  17.083     72.4465     85.41  .       Q .         .         V          .
  17.167     72.9908     79.03  .      Q  .         .         V          .
  17.250     73.4995     73.86  .      Q  .         .         V          .
  17.333     73.9784     69.54  .     Q   .         .         V          .
  17.417     74.4333     66.05  .     Q   .         .         .V         .
  17.500     74.8679     63.10  .     Q   .         .         .V         .
  17.583     75.2856     60.66  .     Q   .         .         .V         .
  17.667     75.6890     58.57  .    Q    .         .         .V         .
  17.750     76.0798     56.75  .    Q    .         .         .V         .
  17.833     76.4596     55.14  .    Q    .         .         .V         .
  17.917     76.8293     53.69  .    Q    .         .         . V        .
  18.000     77.1899     52.35  .    Q    .         .         . V        .
  18.083     77.5422     51.15  .    Q    .         .         . V        .
  18.167     77.8876     50.16  .    Q    .         .         . V        .
  18.250     78.2281     49.43  .   Q     .         .         . V        .
  18.333     78.5647     48.88  .   Q     .         .         . V        .
  18.417     78.8981     48.41  .   Q     .         .         . V        .
  18.500     79.2278     47.87  .   Q     .         .         .  V       .
  18.583     79.5532     47.24  .   Q     .         .         .  V       .
  18.667     79.8739     46.57  .   Q     .         .         .  V       .
  18.750     80.1900     45.90  .   Q     .         .         .  V       .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      100.0     200.0     300.0     400.0
--------------------------------------------------------------------------------
  18.833     80.5015     45.23  .   Q     .         .         .  V      .
  18.917     80.8085     44.58  .   Q     .         .         .  V      .
  19.000     81.1113     43.96  .   Q     .         .         .  V      .
  19.083     81.4100     43.37  .   Q     .         .         .   V     .
  19.167     81.7048     42.80  .   Q     .         .         .   V     .
  19.250     81.9958     42.26  .   Q     .         .         .   V     .
  19.333     82.2832     41.73  .   Q     .         .         .   V     .
  19.417     82.5672     41.23  .   Q     .         .         .   V     .
  19.500     82.8478     40.74  .   Q     .         .         .   V     .
  19.583     83.1252     40.28  .   Q     .         .         .   V     .
  19.667     83.3995     39.83  .  Q      .         .         .   V     .
  19.750     83.6709     39.40  .  Q      .         .         .   V     .
  19.833     83.9393     38.98  .  Q      .         .         .    V    .
  19.917     84.2050     38.58  .  Q      .         .         .    V    .
  20.000     84.4680     38.19  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                         1205.0
            10%                          865.0
            20%                          180.0
            30%                           65.0
            40%                           40.0
            50%                           30.0
            60%                           25.0
            70%                           20.0
            80%                           15.0
            90%                           10.0


********************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   431.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 4 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   431.00 TO NODE   431.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

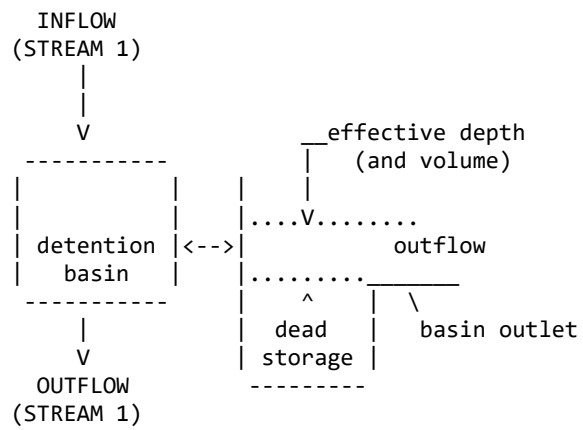
           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      100.0     200.0     300.0     400.0
----------------------------------------------------------------------------
  15.000     53.4587     90.39  .        Q.        V.          .         .
  15.083     54.0983     92.87  .        Q.         V          .         .
  15.167     54.7564     95.56  .        Q.         V          .         .
  15.250     55.4352     98.56  .        Q.         V          .         .
  15.333     56.1368    101.88  .         Q         V          .         .
  15.417     56.8616    105.23  .         Q         .V         .         .
  15.500     57.6031    107.68  .         Q         .V         .         .
  15.583     58.3527    108.84  .         Q         .V         .         .
  15.667     59.1083    109.72  .         Q         .V         .         .
  15.750     59.8799    112.03  .         .Q        . V        .         .
  15.833     60.6921    117.93  .         .Q        . V        .         .
  15.917     61.5791    128.80  .         . Q       . V        .         .
  16.000     62.5894    146.70  .         .   Q     .  V       .         .
  16.083     63.8716    186.18  .         .       Q .  V       .         .
  16.167     65.6685    260.90  .         .         .   V Q    .         .
  16.250     68.0516    346.04  .         .         .    V     .   Q     .
  16.333     70.7106    386.08  .         .         .     V    .       Q .
  16.417     73.2446    367.94  .         .         .      V   .     Q   .
  16.500     75.2466    290.70  .         .         .      V Q.         .
  16.583     76.7437    217.37  .         .         .Q      V .         .
  16.667     77.9097    169.30  .         .     Q   .       V .         .
  16.750     78.8753    140.22  .         .   Q     .        V.         .
  16.833     79.7060    120.62  .         . Q       .        V.         .
  16.917     80.4512    108.20  .         Q         .        V.         .
  17.000     81.1498    101.43  .         Q         .         V         .
  17.083     81.8068     95.40  .        Q.         .         V         .
  17.167     82.4164     88.51  .       Q .         .         V         .
  17.250     82.9868     82.83  .       Q .         .         V         .
  17.333     83.5243     78.04  .      Q  .         .         V         .
  17.417     84.0349     74.15  .      Q  .         .         .V        .
  17.500     84.5232     70.89  .      Q  .         .         .V        .
  17.583     84.9928     68.18  .     Q   .         .         .V        .
  17.667     85.4465     65.87  .     Q   .         .         .V        .
  17.750     85.8862     63.85  .     Q   .         .         .V        .
  17.833     86.3136     62.05  .     Q   .         .         .V        .
  17.917     86.7297     60.43  .     Q   .         .         . V       .
  18.000     87.1356     58.94  .    Q    .         .         . V       .
  18.083     87.5323     57.60  .    Q    .         .         . V       .
  18.167     87.9215     56.51  .    Q    .         .         . V       .
  18.250     88.3052     55.71  .    Q    .         .         . V       .
  18.333     88.6847     55.12  .    Q    .         .         . V       .
  18.417     89.0607     54.59  .    Q    .         .         . V       .
  18.500     89.4324     53.96  .    Q    .         .         .  V      .
  18.583     89.7991     53.25  .    Q    .         .         .  V      .
  18.667     90.1605     52.49  .    Q    .         .         .  V      .
  18.750     90.5168     51.72  .    Q    .         .         .  V      .
```

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. | 100.0 | 200.0 | 300.0 | 400.0 |
|---|---|---|---|---|---|---|---|
| 18.833 | 90.8678 | 50.97 | . Q | . | . | . V | . |
| 18.917 | 91.2139 | 50.25 | . Q | . | . | . V | . |
| 19.000 | 91.5551 | 49.55 | . Q | . | . | . V | . |
| 19.083 | 91.8918 | 48.89 | . Q | . | . | . V | . |
| 19.167 | 92.2241 | 48.25 | . Q | . | . | . V | . |
| 19.250 | 92.5522 | 47.63 | . Q | . | . | . V | . |
| 19.333 | 92.8762 | 47.04 | . Q | . | . | . V | . |
| 19.417 | 93.1963 | 46.48 | . Q | . | . | . V | . |
| 19.500 | 93.5126 | 45.93 | . Q | . | . | . V | . |
| 19.583 | 93.8254 | 45.41 | . Q | . | . | . V | . |
| 19.667 | 94.1346 | 44.91 | . Q | . | . | . V | . |
| 19.750 | 94.4405 | 44.42 | . Q | . | . | . V | . |
| 19.833 | 94.7432 | 43.95 | . Q | . | . | . V | . |
| 19.917 | 95.0428 | 43.50 | . Q | . | . | . V | . |
| 20.000 | 95.3393 | 43.06 | . Q | . | . | . V | . |

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

| Percentile of Estimated Peak Flow Rate | Duration (minutes) |
|---|---|
| 0% | 1205.0 |
| 10% | 835.0 |
| 20% | 175.0 |
| 30% | 65.0 |
| 40% | 40.0 |
| 50% | 30.0 |
| 60% | 25.0 |
| 70% | 20.0 |
| 80% | 15.0 |
| 90% | 10.0 |

```
****************************************************************************
  FLOW PROCESS FROM NODE    91.00 TO NODE    91.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================
```




ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
  DEAD STORAGE(AF) =  0.000
  SPECIFIED DEAD STORAGE(AF) FILLED =  0.000
  SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =  0.000
  DETENTION BASIN CONSTANT LOSS RATE(CFS) =  0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

| INTERVAL NUMBER | DEPTH (FT) | OUTFLOW (CFS) | STORAGE (AF) |
|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.000 |
| 2 | 0.50 | 9.00 | 0.520 |
| 3 | 1.00 | 25.00 | 1.080 |
| 4 | 1.50 | 45.00 | 1.690 |
| 5 | 2.00 | 62.00 | 2.340 |
| 6 | 2.50 | 78.00 | 3.050 |
| 7 | 3.00 | 92.00 | 3.800 |
| 8 | 4.00 | 115.00 | 5.510 |
| 9 | 5.00 | 134.00 | 8.200 |
| 10 | 6.00 | 150.00 | 11.960 |
| 11 | 7.00 | 166.00 | 16.170 |
| 12 | 8.00 | 179.00 | 20.740 |
| 13 | 9.00 | 192.00 | 25.640 |
| 14 | 10.00 | 204.00 | 30.860 |
| 15 | 12.00 | 226.00 | 42.220 |
| 16 | 14.00 | 246.00 | 54.510 |
| 17 | 14.50 | 251.00 | 57.740 |
| 18 | 16.00 | 265.00 | 68.140 |

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 15.083 | 0.000 | 92.87 | 0.00 | 2.61 | 80.2 | 3.212 |
| 15.167 | 0.000 | 95.56 | 0.00 | 2.67 | 81.9 | 3.306 |
| 15.250 | 0.000 | 98.56 | 0.00 | 2.74 | 83.7 | 3.408 |
| 15.333 | 0.000 | 101.88 | 0.00 | 2.81 | 85.7 | 3.519 |
| 15.417 | 0.000 | 105.23 | 0.00 | 2.89 | 87.9 | 3.639 |
| 15.500 | 0.000 | 107.68 | 0.00 | 2.97 | 90.1 | 3.760 |
| 15.583 | 0.000 | 108.84 | 0.00 | 3.04 | 92.1 | 3.875 |
| 15.667 | 0.000 | 109.72 | 0.00 | 3.11 | 93.7 | 3.985 |
| 15.750 | 0.000 | 112.03 | 0.00 | 3.18 | 95.3 | 4.100 |
| 15.833 | 0.000 | 117.93 | 0.00 | 3.26 | 97.0 | 4.244 |
| 15.917 | 0.000 | 128.80 | 0.00 | 3.38 | 99.3 | 4.447 |
| 16.000 | 0.000 | 146.70 | 0.00 | 3.56 | 102.7 | 4.750 |
| 16.083 | 0.000 | 186.18 | 0.00 | 3.87 | 108.4 | 5.286 |
| 16.167 | 0.000 | 260.90 | 0.00 | 4.29 | 116.2 | 6.282 |
| 16.250 | 0.000 | 346.04 | 0.00 | 4.85 | 125.8 | 7.799 |
| 16.333 | 0.000 | 386.08 | 0.00 | 5.35 | 135.4 | 9.525 |
| 16.417 | 0.000 | 367.94 | 0.00 | 5.76 | 142.9 | 11.075 |
| 16.500 | 0.000 | 290.70 | 0.00 | 6.02 | 148.3 | 12.056 |
| 16.583 | 0.000 | 217.37 | 0.00 | 6.13 | 151.2 | 12.511 |
| 16.667 | 0.000 | 169.30 | 0.00 | 6.16 | 152.3 | 12.628 |
| 16.750 | 0.000 | 140.22 | 0.00 | 6.14 | 152.4 | 12.544 |
| 16.833 | 0.000 | 120.62 | 0.00 | 6.09 | 151.8 | 12.329 |
| 16.917 | 0.000 | 108.20 | 0.00 | 6.02 | 150.8 | 12.036 |
| 17.000 | 0.000 | 101.43 | 0.00 | 5.93 | 149.6 | 11.704 |
| 17.083 | 0.000 | 95.40 | 0.00 | 5.84 | 148.1 | 11.341 |
| 17.167 | 0.000 | 88.51 | 0.00 | 5.73 | 146.5 | 10.941 |
| 17.250 | 0.000 | 82.83 | 0.00 | 5.62 | 144.8 | 10.515 |
| 17.333 | 0.000 | 78.04 | 0.00 | 5.50 | 142.9 | 10.068 |
| 17.417 | 0.000 | 74.15 | 0.00 | 5.37 | 141.0 | 9.608 |
| 17.500 | 0.000 | 70.89 | 0.00 | 5.25 | 139.0 | 9.139 |
| 17.583 | 0.000 | 68.18 | 0.00 | 5.12 | 137.0 | 8.665 |
| 17.667 | 0.000 | 65.87 | 0.00 | 5.00 | 135.0 | 8.189 |
| 17.750 | 0.000 | 63.85 | 0.00 | 4.82 | 132.3 | 7.718 |
| 17.833 | 0.000 | 62.05 | 0.00 | 4.65 | 129.0 | 7.257 |
| 17.917 | 0.000 | 60.43 | 0.00 | 4.48 | 125.8 | 6.807 |
| 18.000 | 0.000 | 58.94 | 0.00 | 4.32 | 122.6 | 6.369 |
| 18.083 | 0.000 | 57.60 | 0.00 | 4.16 | 119.6 | 5.942 |
| 18.167 | 0.000 | 56.51 | 0.00 | 4.01 | 116.6 | 5.528 |
| 18.250 | 0.000 | 55.71 | 0.00 | 3.78 | 112.6 | 5.137 |
| 18.333 | 0.000 | 55.12 | 0.00 | 3.57 | 107.6 | 4.776 |
| 18.417 | 0.000 | 54.59 | 0.00 | 3.38 | 102.9 | 4.443 |
| 18.500 | 0.000 | 53.96 | 0.00 | 3.20 | 98.6 | 4.136 |
| 18.583 | 0.000 | 53.25 | 0.00 | 3.03 | 94.6 | 3.851 |
| 18.667 | 0.000 | 52.49 | 0.00 | 2.86 | 90.4 | 3.590 |
| 18.750 | 0.000 | 51.72 | 0.00 | 2.70 | 85.9 | 3.355 |
| 18.833 | 0.000 | 50.97 | 0.00 | 2.56 | 81.7 | 3.143 |
| 18.917 | 0.000 | 50.25 | 0.00 | 2.43 | 77.8 | 2.953 |
| 19.000 | 0.000 | 49.55 | 0.00 | 2.31 | 73.9 | 2.785 |
| 19.083 | 0.000 | 48.89 | 0.00 | 2.21 | 70.4 | 2.638 |
| 19.167 | 0.000 | 48.25 | 0.00 | 2.12 | 67.2 | 2.507 |

```
================================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)
```

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 19.250 | 0.000 | 47.63 | 0.00 | 2.04 | 64.5 | 2.391 |
| 19.333 | 0.000 | 47.04 | 0.00 | 1.96 | 61.9 | 2.289 |
| 19.417 | 0.000 | 46.48 | 0.00 | 1.89 | 59.5 | 2.199 |
| 19.500 | 0.000 | 45.93 | 0.00 | 1.83 | 57.3 | 2.121 |
| 19.583 | 0.000 | 45.41 | 0.00 | 1.78 | 55.4 | 2.052 |
| 19.667 | 0.000 | 44.91 | 0.00 | 1.73 | 53.7 | 1.992 |
| 19.750 | 0.000 | 44.42 | 0.00 | 1.69 | 52.2 | 1.938 |
| 19.833 | 0.000 | 43.95 | 0.00 | 1.65 | 50.9 | 1.891 |
| 19.917 | 0.000 | 43.50 | 0.00 | 1.62 | 49.7 | 1.848 |
| 20.000 | 0.000 | 43.06 | 0.00 | 1.59 | 48.6 | 1.810 |
| 20.083 | 0.000 | 42.64 | 0.00 | 1.57 | 47.7 | 1.775 |
| 20.167 | 0.000 | 42.23 | 0.00 | 1.54 | 46.8 | 1.743 |
| 20.250 | 0.000 | 41.83 | 0.00 | 1.52 | 46.0 | 1.714 |
| 20.333 | 0.000 | 41.44 | 0.00 | 1.50 | 45.3 | 1.688 |
| 20.417 | 0.000 | 41.07 | 0.00 | 1.48 | 44.5 | 1.664 |
| 20.500 | 0.000 | 40.71 | 0.00 | 1.46 | 43.8 | 1.643 |
| 20.583 | 0.000 | 40.36 | 0.00 | 1.45 | 43.1 | 1.624 |
| 20.667 | 0.000 | 40.01 | 0.00 | 1.43 | 42.5 | 1.606 |
| 20.750 | 0.000 | 39.68 | 0.00 | 1.42 | 42.0 | 1.590 |
| 20.833 | 0.000 | 39.36 | 0.00 | 1.41 | 41.5 | 1.576 |
| 20.917 | 0.000 | 39.04 | 0.00 | 1.40 | 41.0 | 1.562 |
| 21.000 | 0.000 | 38.73 | 0.00 | 1.38 | 40.6 | 1.549 |
| 21.083 | 0.000 | 38.44 | 0.00 | 1.37 | 40.2 | 1.537 |
| 21.167 | 0.000 | 38.14 | 0.00 | 1.37 | 39.8 | 1.526 |
| 21.250 | 0.000 | 37.86 | 0.00 | 1.36 | 39.4 | 1.515 |
| 21.333 | 0.000 | 37.58 | 0.00 | 1.35 | 39.1 | 1.504 |
| 21.417 | 0.000 | 37.31 | 0.00 | 1.34 | 38.8 | 1.495 |
| 21.500 | 0.000 | 37.05 | 0.00 | 1.33 | 38.4 | 1.485 |
| 21.583 | 0.000 | 36.79 | 0.00 | 1.32 | 38.1 | 1.476 |
| 21.667 | 0.000 | 36.54 | 0.00 | 1.32 | 37.8 | 1.467 |
| 21.750 | 0.000 | 36.29 | 0.00 | 1.31 | 37.5 | 1.458 |
| 21.833 | 0.000 | 36.05 | 0.00 | 1.30 | 37.3 | 1.450 |
| 21.917 | 0.000 | 35.81 | 0.00 | 1.30 | 37.0 | 1.442 |
| 22.000 | 0.000 | 35.58 | 0.00 | 1.29 | 36.7 | 1.434 |
| 22.083 | 0.000 | 35.36 | 0.00 | 1.28 | 36.5 | 1.426 |
| 22.167 | 0.000 | 35.13 | 0.00 | 1.28 | 36.2 | 1.419 |
| 22.250 | 0.000 | 34.92 | 0.00 | 1.27 | 36.0 | 1.411 |
| 22.333 | 0.000 | 34.71 | 0.00 | 1.27 | 35.7 | 1.404 |
| 22.417 | 0.000 | 34.50 | 0.00 | 1.26 | 35.5 | 1.397 |
| 22.500 | 0.000 | 34.29 | 0.00 | 1.25 | 35.3 | 1.390 |
| 22.583 | 0.000 | 34.09 | 0.00 | 1.25 | 35.1 | 1.384 |
| 22.667 | 0.000 | 33.90 | 0.00 | 1.24 | 34.8 | 1.377 |
| 22.750 | 0.000 | 33.70 | 0.00 | 1.24 | 34.6 | 1.371 |
| 22.833 | 0.000 | 33.51 | 0.00 | 1.23 | 34.4 | 1.364 |
| 22.917 | 0.000 | 33.33 | 0.00 | 1.23 | 34.2 | 1.358 |
| 23.000 | 0.000 | 33.15 | 0.00 | 1.22 | 34.0 | 1.352 |
| 23.083 | 0.000 | 32.97 | 0.00 | 1.22 | 33.8 | 1.346 |
| 23.167 | 0.000 | 32.79 | 0.00 | 1.21 | 33.6 | 1.340 |
| 23.250 | 0.000 | 32.62 | 0.00 | 1.21 | 33.4 | 1.335 |
| 23.333 | 0.000 | 32.45 | 0.00 | 1.20 | 33.3 | 1.329 |

```
================================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)

           CLOCK                                                  MEAN
            TIME  DEAD-STORAGE  INFLOW    LOSS   EFFECTIVE OUTFLOW  EFFECTIVE
           (HRS)   FILLED(AF)    (CFS)    (CFS)  DEPTH(FT)  (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
          23.417        0.000    32.28     0.00      1.20     33.1      1.324
          23.500        0.000    32.12     0.00      1.20     32.9      1.318
          23.583        0.000    31.96     0.00      1.19     32.7      1.313
          23.667        0.000    31.80     0.00      1.19     32.6      1.308
          23.750        0.000    31.64     0.00      1.18     32.4      1.303
          23.833        0.000    31.49     0.00      1.18     32.2      1.298
          23.917        0.000    31.34     0.00      1.17     32.1      1.293
--------------------------------------------------------------------------------
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =    108.045 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =    108.045 AF
    LOSS    VOLUME =      0.000 AF
================================================================================

  END OF FLOODSCx ROUTING ANALYSIS
```

Starting volume filled for 24-hour peak period

```
**************************************************************************

            F L O O D    R O U T I N G    A N A L Y S I S
         USING COUNTY HYDROLOGY MANUAL OF SAN BERNARDINO(1986)
        (c) Copyright 1989-2015 Advanced Engineering Software (aes)
            Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* 15th Street Basin Modified - 2 Day Storm 24 Hour Peak                  *
* 9' x 1.5' Outlet Opening                                               *
* File: E15CR21                                                          *
 **************************************************************************

  FILE NAME: C:\aes2015\hydrosft\floodX\E15CR21.fld
  TIME/DATE OF STUDY: 10:59 07/31/2018



**************************************************************************
  FLOW PROCESS FROM NODE     9.00 TO NODE    81.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =     379.090 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.320 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.390
         LOW LOSS FRACTION = 0.365
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

         *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.980
          30-MINUTE FACTOR = 0.980
           1-HOUR FACTOR = 0.980
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000
```

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 26.042

RUNOFF HYDROGRAPH LISTING LIMITS:
MODEL TIME(HOURS) FOR BEGINNING OF RESULTS = 15.00
MODEL TIME(HOURS) FOR END OF RESULTS = 20.00

UNIT HYDROGRAPH DETERMINATION

| INTERVAL NUMBER | "S" GRAPH MEAN VALUES | UNIT HYDROGRAPH ORDINATES(CFS) |
|---|---|---|
| 1 | 1.572 | 72.053 |
| 2 | 8.065 | 297.710 |
| 3 | 22.451 | 659.544 |
| 4 | 41.662 | 880.717 |
| 5 | 63.212 | 988.028 |
| 6 | 79.350 | 739.862 |
| 7 | 88.790 | 432.771 |
| 8 | 94.038 | 240.601 |
| 9 | 96.928 | 132.516 |
| 10 | 98.232 | 59.761 |
| 11 | 98.721 | 22.406 |
| 12 | 99.209 | 22.385 |
| 13 | 99.684 | 21.759 |
| 14 | 99.921 | 10.880 |
| 15 | 100.000 | 3.627 |

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 93.0661
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 177.5757

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 175.0 350.0 525.0 700.0 |
|---|---|---|---|
| 15.000 | 85.9579 | 143.23 | . Q . V. . . |
| 15.083 | 86.9716 | 147.18 | . Q . V. . . |
| 15.167 | 88.0147 | 151.46 | . Q . V. . . |
| 15.250 | 89.0907 | 156.24 | . Q . V . . |
| 15.333 | 90.2030 | 161.50 | . Q. V . . |
| 15.417 | 91.3530 | 166.99 | . Q. V . . |
| 15.500 | 92.5351 | 171.64 | . Q. V . . |
| 15.583 | 93.7400 | 174.94 | . Q. .V . . |
| 15.667 | 94.9660 | 178.02 | . Q .V . . |
| 15.750 | 96.2227 | 182.47 | . Q .V . . |
| 15.833 | 97.5415 | 191.49 | . Q .V . . |
| 15.917 | 98.9807 | 208.98 | . .Q . V . . |
| 16.000 | 100.6408 | 241.05 | . . Q . V . . |
| 16.083 | 102.8102 | 314.99 | . . Q . V . . |
| 16.167 | 105.8805 | 445.82 | . . . V Q . . |
| 16.250 | 110.0457 | 604.79 | . . . V . Q . |
| 16.333 | 114.7813 | 687.60 | . . . V . Q. |
| 16.417 | 119.5373 | 690.58 | . . . V . Q. |
| 16.500 | 123.4003 | 560.91 | . . . V . Q . |
| 16.583 | 126.2454 | 413.10 | . . . Q V . . |
| 16.667 | 128.3936 | 311.92 | . . Q . V . . |
| 16.750 | 130.1084 | 248.98 | . . Q . V. . |
| 16.833 | 131.5249 | 205.67 | . .Q . V. . |
| 16.917 | 132.7604 | 179.40 | . Q . V. . |
| 17.000 | 133.9167 | 167.89 | . Q. . V . |
| 17.083 | 135.0027 | 157.69 | . Q. . V . |
| 17.167 | 136.0033 | 145.30 | . Q . . V . |
| 17.250 | 136.9332 | 135.01 | . Q . . V . |
| 17.333 | 137.8086 | 127.11 | . Q . . .V . |
| 17.417 | 138.6436 | 121.25 | . Q . . .V . |
| 17.500 | 139.4442 | 116.24 | . Q . . .V . |
| 17.583 | 140.2153 | 111.97 | . Q . . .V . |
| 17.667 | 140.9608 | 108.24 | . Q . . .V . |
| 17.750 | 141.6836 | 104.95 | . Q . . .V . |
| 17.833 | 142.3862 | 102.02 | . Q . . . V . |
| 17.917 | 143.0704 | 99.36 | . Q . . . V . |
| 18.000 | 143.7379 | 96.91 | . Q . . . V . |
| 18.083 | 144.3900 | 94.69 | . Q . . . V . |
| 18.167 | 145.0288 | 92.76 | . Q . . . V . |
| 18.250 | 145.6567 | 91.17 | . Q . . . V . |
| 18.333 | 146.2755 | 89.84 | . Q . . . V . |
| 18.417 | 146.8862 | 88.68 | . Q . . . . V . |
| 18.500 | 147.4888 | 87.49 | . Q . . . . V . |
| 18.583 | 148.0827 | 86.23 | . Q . . . . V . |
| 18.667 | 148.6677 | 84.94 | . Q . . . . V . |
| 18.750 | 149.2439 | 83.67 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      175.0     350.0     525.0     700.0
--------------------------------------------------------------------------------
  18.833    149.8117     82.43  .   Q     .         .         .  V      .
  18.917    150.3711     81.23  .   Q     .         .         .  V      .
  19.000    150.9227     80.09  .   Q     .         .         .  V      .
  19.083    151.4668     79.00  .   Q     .         .         .   V     .
  19.167    152.0037     77.96  .   Q     .         .         .   V     .
  19.250    152.5337     76.95  .   Q     .         .         .   V     .
  19.333    153.0570     75.99  .   Q     .         .         .   V     .
  19.417    153.5739     75.06  .   Q     .         .         .   V     .
  19.500    154.0847     74.17  .   Q     .         .         .   V     .
  19.583    154.5897     73.32  .   Q     .         .         .   V     .
  19.667    155.0889     72.49  .   Q     .         .         .   V     .
  19.750    155.5827     71.70  .   Q     .         .         .    V    .
  19.833    156.0712     70.93  .   Q     .         .         .    V    .
  19.917    156.5547     70.19  .   Q     .         .         .    V    .
  20.000    157.0332     69.48  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           655.0
            20%                           140.0
            30%                            55.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            20.0
            90%                            10.0



********************************************************************************
  FLOW PROCESS FROM NODE   109.00 TO NODE   251.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #2)

         WATERSHED AREA =      60.740 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.260 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.380
         LOW LOSS FRACTION = 0.358
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  32.051


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 2.050                15.056
        2                12.541                77.066
        3                32.902               149.568
        4                59.287               193.817
        5                79.698               149.934
        6                90.409                78.679
        7                95.683                38.739
        8                97.996                16.991
        9                98.702                 5.189
       10                99.294                 4.352
       11                99.718                 3.110
       12                99.929                 1.555
       13               100.000                 0.518


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      14.6203
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      28.7433
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 14.0464 | 23.65 | . Q . V. . . |
| 15.083 | 14.2139 | 24.32 | . Q . V. . . |
| 15.167 | 14.3866 | 25.07 | . Q . V . . |
| 15.250 | 14.5649 | 25.89 | . Q . V . . |
| 15.333 | 14.7496 | 26.82 | . Q . V . . |
| 15.417 | 14.9407 | 27.75 | . Q . V . . |
| 15.500 | 15.1364 | 28.41 | . Q . .V . . |
| 15.583 | 15.3344 | 28.75 | . Q . .V . . |
| 15.667 | 15.5346 | 29.07 | . Q . .V . . |
| 15.750 | 15.7416 | 30.06 | . Q . .V . . |
| 15.833 | 15.9633 | 32.19 | . Q . . V . . |
| 15.917 | 16.2101 | 35.84 | . Q . . V . . |
| 16.000 | 16.5046 | 42.76 | . Q . . V . . |
| 16.083 | 16.9074 | 58.49 | . .Q . V . . |
| 16.167 | 17.5226 | 89.33 | . . Q . V . . |
| 16.250 | 18.3352 | 117.99 | . . . Q V . . |
| 16.333 | 19.2156 | 127.84 | . . . QV . . |
| 16.417 | 19.9321 | 104.02 | . . Q V . . |
| 16.500 | 20.4229 | 71.28 | . . Q . V . . |
| 16.583 | 20.7722 | 50.72 | . Q . V . . |
| 16.667 | 21.0399 | 38.87 | . Q . . V. . |
| 16.750 | 21.2608 | 32.07 | . Q . . V. . |
| 16.833 | 21.4633 | 29.40 | . Q . . V. . |
| 16.917 | 21.6496 | 27.06 | . Q . . V . |
| 17.000 | 21.8211 | 24.91 | . Q . . V . |
| 17.083 | 21.9807 | 23.17 | . Q . . V . |
| 17.167 | 22.1309 | 21.81 | . Q . . V . |
| 17.250 | 22.2737 | 20.74 | . Q . . V . |
| 17.333 | 22.4098 | 19.76 | . Q . . .V . |
| 17.417 | 22.5401 | 18.92 | . Q . . .V . |
| 17.500 | 22.6656 | 18.21 | . Q . . .V . |
| 17.583 | 22.7868 | 17.61 | . Q . . .V . |
| 17.667 | 22.9044 | 17.07 | . Q . . .V . |
| 17.750 | 23.0187 | 16.60 | . Q . . . V . |
| 17.833 | 23.1300 | 16.16 | . Q . . . V . |
| 17.917 | 23.2385 | 15.76 | . Q . . . V . |
| 18.000 | 23.3445 | 15.39 | . Q . . . V . |
| 18.083 | 23.4483 | 15.06 | . Q . . . V . |
| 18.167 | 23.5501 | 14.79 | . Q . . . V . |
| 18.250 | 23.6504 | 14.57 | . Q . . . V . |
| 18.333 | 23.7496 | 14.40 | . Q . . . . V . |
| 18.417 | 23.8476 | 14.22 | . Q . . . . V . |
| 18.500 | 23.9441 | 14.02 | . Q . . . . V . |
| 18.583 | 24.0392 | 13.81 | . Q . . . . V . |
| 18.667 | 24.1329 | 13.60 | . Q . . . . V . |
| 18.750 | 24.2251 | 13.40 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     24.3160     13.20  . Q       .         .         .  V      .
  18.917     24.4057     13.01  . Q       .         .         .  V      .
  19.000     24.4941     12.83  . Q       .         .         .   V     .
  19.083     24.5813     12.66  . Q       .         .         .   V     .
  19.167     24.6673     12.50  . Q       .         .         .   V     .
  19.250     24.7523     12.34  . Q       .         .         .   V     .
  19.333     24.8363     12.19  . Q       .         .         .   V     .
  19.417     24.9192     12.04  . Q       .         .         .   V     .
  19.500     25.0012     11.90  . Q       .         .         .   V     .
  19.583     25.0823     11.77  . Q       .         .         .   V     .
  19.667     25.1625     11.64  . Q       .         .         .    V    .
  19.750     25.2418     11.52  . Q       .         .         .    V    .
  19.833     25.3203     11.40  . Q       .         .         .    V    .
  19.917     25.3979     11.28  . Q       .         .         .    V    .
  20.000     25.4748     11.17  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           485.0
            20%                           105.0
            30%                            45.0
            40%                            30.0
            50%                            25.0
            60%                            20.0
            70%                            15.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   309.00 TO NODE   361.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #3)

         WATERSHED AREA =      81.340 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.300 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.410
         LOW LOSS FRACTION = 0.378
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  27.778


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


=============================================================================
                      UNIT HYDROGRAPH DETERMINATION

-----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
-----------------------------------------------------------------------------
        1                 1.701                16.730
        2                 9.283                74.585
        3                25.290               157.462
        4                46.738               210.990
        5                68.920               218.201
        6                83.414               142.577
        7                91.365                78.214
        8                95.710                42.750
        9                97.845                21.003
       10                98.542                 6.849
       11                99.063                 5.124
       12                99.583                 5.124
       13               100.000                 4.099


-----------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      20.6973
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      37.3737
-----------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 18.1187 | 30.29 | . Q . V. . . |
| 15.083 | 18.3332 | 31.14 | . Q . V. . . |
| 15.167 | 18.5539 | 32.06 | . Q . V. . . |
| 15.250 | 18.7818 | 33.08 | . Q . V . . |
| 15.333 | 19.0174 | 34.22 | . Q . V . . |
| 15.417 | 19.2612 | 35.39 | . Q . V . . |
| 15.500 | 19.5115 | 36.34 | . Q . V . . |
| 15.583 | 19.7661 | 36.98 | . Q . .V . . |
| 15.667 | 20.0247 | 37.54 | . Q . .V . . |
| 15.750 | 20.2901 | 38.53 | . Q . .V . . |
| 15.833 | 20.5702 | 40.67 | . Q . . V . . |
| 15.917 | 20.8778 | 44.67 | . Q . . V . . |
| 16.000 | 21.2364 | 52.06 | . Q . V . . |
| 16.083 | 21.7130 | 69.21 | . . Q . V . . |
| 16.167 | 22.4078 | 100.88 | . . Q V . . |
| 16.250 | 23.3473 | 136.42 | . . . V Q . . |
| 16.333 | 24.4078 | 153.98 | . . . V Q . |
| 16.417 | 25.4216 | 147.21 | . . . V Q. . |
| 16.500 | 26.1888 | 111.39 | . . . Q V . . |
| 16.583 | 26.7414 | 80.23 | . . Q . V . . |
| 16.667 | 27.1609 | 60.92 | . Q . V. . |
| 16.750 | 27.4955 | 48.59 | . Q. . V. . |
| 16.833 | 27.7740 | 40.42 | . Q . . V. . |
| 16.917 | 28.0294 | 37.09 | . Q . . V. . |
| 17.000 | 28.2687 | 34.75 | . Q . . V . |
| 17.083 | 28.4910 | 32.28 | . Q . . V . |
| 17.167 | 28.6921 | 29.20 | . Q . . V . |
| 17.250 | 28.8825 | 27.65 | . Q . . V . |
| 17.333 | 29.0638 | 26.33 | . Q . . .V . |
| 17.417 | 29.2371 | 25.16 | . Q . . .V . |
| 17.500 | 29.4034 | 24.15 | . Q . . .V . |
| 17.583 | 29.5637 | 23.29 | . Q . . .V . |
| 17.667 | 29.7189 | 22.54 | . Q . . .V . |
| 17.750 | 29.8696 | 21.87 | . Q . . .V . |
| 17.833 | 30.0161 | 21.28 | . Q . . . V . |
| 17.917 | 30.1589 | 20.73 | . Q . . . V . |
| 18.000 | 30.2982 | 20.23 | . Q . . . V . |
| 18.083 | 30.4344 | 19.77 | . Q . . . V . |
| 18.167 | 30.5679 | 19.38 | . Q . . . V . |
| 18.250 | 30.6992 | 19.07 | . Q . . . V . |
| 18.333 | 30.8287 | 18.81 | . Q . . . V . |
| 18.417 | 30.9567 | 18.57 | . Q . . . . V . |
| 18.500 | 31.0829 | 18.32 | . Q . . . . V . |
| 18.583 | 31.2072 | 18.05 | . Q . . . . V . |
| 18.667 | 31.3297 | 17.78 | . Q . . . . V . |
| 18.750 | 31.4503 | 17.52 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     31.5691     17.26  .  Q      .         .         .  V      .
  18.917     31.6863     17.01  .  Q      .         .         .  V      .
  19.000     31.8018     16.77  .  Q      .         .         .   V     .
  19.083     31.9157     16.55  .  Q      .         .         .   V     .
  19.167     32.0282     16.33  .  Q      .         .         .   V     .
  19.250     32.1392     16.12  .  Q      .         .         .   V     .
  19.333     32.2488     15.92  .  Q      .         .         .   V     .
  19.417     32.3571     15.72  .  Q      .         .         .   V     .
  19.500     32.4641     15.54  .  Q      .         .         .   V     .
  19.583     32.5699     15.36  .  Q      .         .         .   V     .
  19.667     32.6746     15.19  .  Q      .         .         .   V     .
  19.750     32.7780     15.03  .  Q      .         .         .    V    .
  19.833     32.8804     14.87  . Q       .         .         .    V    .
  19.917     32.9817     14.71  . Q       .         .         .    V    .
  20.000     33.0820     14.56  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           570.0
            20%                           125.0
            30%                            50.0
            40%                            35.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   409.00 TO NODE   431.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
================================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #4)

         WATERSHED AREA =      62.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.240 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.340
         LOW LOSS FRACTION = 0.322
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.45
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.05
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.46
```

```
          SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.67
          SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.91
          SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  8.57

          *USER SPECIFIED PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
            5-MINUTE FACTOR = 0.980
           30-MINUTE FACTOR = 0.980
            1-HOUR FACTOR = 0.980
            3-HOUR FACTOR = 1.000
            6-HOUR FACTOR = 1.000
           24-HOUR FACTOR = 1.000

          UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
          UNIT INTERVAL PERCENTAGE OF LAG-TIME =  34.722


          RUNOFF HYDROGRAPH LISTING LIMITS:
          MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  15.00
          MODEL TIME(HOURS) FOR END OF RESULTS =  20.00


================================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------------
        1                 2.308                17.499
        2                14.779                94.568
        3                38.225               177.789
        4                66.233               212.371
        5                84.561               138.980
        6                93.250                65.884
        7                97.213                30.057
        8                98.477                 9.578
        9                99.128                 4.936
       10                99.651                 3.969
       11                99.913                 1.985
       12               100.000                 0.662


--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =      13.5705
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =      31.1916
--------------------------------------------------------------------------------
```

2 4 - H O U R  S T O R M
R U N O F F  H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

| TIME(HRS) | VOLUME(AF) | Q(CFS) | 0. 50.0 100.0 150.0 200.0 |
|---|---|---|---|
| 15.000 | 15.3579 | 25.95 | . Q . V. . . |
| 15.083 | 15.5418 | 26.70 | . Q . V. . . |
| 15.167 | 15.7314 | 27.53 | . Q . V . . |
| 15.250 | 15.9273 | 28.45 | . Q . V . . |
| 15.333 | 16.1304 | 29.49 | . Q . V . . |
| 15.417 | 16.3406 | 30.52 | . Q . V . . |
| 15.500 | 16.5553 | 31.18 | . Q . .V . . |
| 15.583 | 16.7717 | 31.42 | . Q . .V . . |
| 15.667 | 16.9903 | 31.75 | . Q . .V . . |
| 15.750 | 17.2180 | 33.05 | . Q . . V . . |
| 15.833 | 17.4635 | 35.64 | . Q . . V . . |
| 15.917 | 17.7384 | 39.93 | . Q . . V . . |
| 16.000 | 18.0693 | 48.04 | . Q. . V . . |
| 16.083 | 18.5256 | 66.25 | . . Q . V . . |
| 16.167 | 19.2326 | 102.65 | . . Q V . . |
| 16.250 | 20.1504 | 133.26 | . . . VQ . . |
| 16.333 | 21.0950 | 137.16 | . . . Q . . |
| 16.417 | 21.7994 | 102.28 | . . Q V . . |
| 16.500 | 22.2689 | 68.18 | . . Q . V . . |
| 16.583 | 22.6071 | 49.10 | . Q. . V . . |
| 16.667 | 22.8707 | 38.27 | . Q . . V. . |
| 16.750 | 23.1035 | 33.80 | . Q . . V. . |
| 16.833 | 23.3174 | 31.06 | . Q . . V. . |
| 16.917 | 23.5130 | 28.41 | . Q . . V . |
| 17.000 | 23.6940 | 26.27 | . Q . . V . |
| 17.083 | 23.8638 | 24.66 | . Q . . V . |
| 17.167 | 24.0252 | 23.44 | . Q . . V . |
| 17.250 | 24.1789 | 22.31 | . Q . . .V . |
| 17.333 | 24.3253 | 21.27 | . Q . . .V . |
| 17.417 | 24.4657 | 20.39 | . Q . . .V . |
| 17.500 | 24.6010 | 19.65 | . Q . . .V . |
| 17.583 | 24.7320 | 19.02 | . Q . . .V . |
| 17.667 | 24.8592 | 18.46 | . Q . . .V . |
| 17.750 | 24.9828 | 17.96 | . Q . . . V . |
| 17.833 | 25.1033 | 17.49 | . Q . . . V . |
| 17.917 | 25.2208 | 17.07 | . Q . . . V . |
| 18.000 | 25.3357 | 16.68 | . Q . . . V . |
| 18.083 | 25.4481 | 16.32 | . Q . . . V . |
| 18.167 | 25.5586 | 16.04 | . Q . . . V . |
| 18.250 | 25.6676 | 15.82 | . Q . . . V . |
| 18.333 | 25.7753 | 15.65 | . Q . . . . V . |
| 18.417 | 25.8818 | 15.45 | . Q . . . . V . |
| 18.500 | 25.9866 | 15.23 | . Q . . . . V . |
| 18.583 | 26.0899 | 15.00 | . Q . . . . V . |
| 18.667 | 26.1916 | 14.77 | . Q . . . . V . |
| 18.750 | 26.2918 | 14.55 | . Q . . . . V . |

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
--------------------------------------------------------------------------------
  18.833     26.3905     14.34  . Q       .         .         .  V      .
  18.917     26.4879     14.13  . Q       .         .         .  V      .
  19.000     26.5839     13.94  . Q       .         .         .   V     .
  19.083     26.6786     13.76  . Q       .         .         .   V     .
  19.167     26.7721     13.58  . Q       .         .         .   V     .
  19.250     26.8645     13.41  . Q       .         .         .   V     .
  19.333     26.9557     13.25  . Q       .         .         .   V     .
  19.417     27.0459     13.09  . Q       .         .         .   V     .
  19.500     27.1350     12.94  . Q       .         .         .   V     .
  19.583     27.2231     12.79  . Q       .         .         .   V     .
  19.667     27.3102     12.65  . Q       .         .         .    V    .
  19.750     27.3965     12.52  . Q       .         .         .    V    .
  19.833     27.4818     12.39  . Q       .         .         .    V    .
  19.917     27.5662     12.26  . Q       .         .         .    V    .
  20.000     27.6499     12.14  . Q       .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
              0%                        1205.0
             10%                         500.0
             20%                         110.0
             30%                          40.0
             40%                          30.0
             50%                          20.0
             60%                          20.0
             70%                          20.0
             80%                          10.0
             90%                          10.0


********************************************************************************
  FLOW PROCESS FROM NODE    81.00 TO NODE   251.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 2 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   251.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      225.0     450.0     675.0     900.0
----------------------------------------------------------------------------
  15.000    100.0044    166.88  .      Q  .        V.          .         .
  15.083    101.1855    171.51  .      Q  .        V.          .         .
  15.167    102.4013    176.53  .      Q  .        V.          .         .
  15.250    103.6556    182.13  .       Q .         V          .         .
  15.333    104.9525    188.31  .       Q .         V          .         .
  15.417    106.2937    194.74  .       Q .         V          .         .
  15.500    107.6715    200.05  .       Q .         V          .         .
  15.583    109.0743    203.69  .        Q.         .V         .         .
  15.667    110.5005    207.08  .        Q.         .V         .         .
  15.750    111.9642    212.54  .        Q.         .V         .         .
  15.833    113.5048    223.68  .        Q.         . V        .         .
  15.917    115.1908    244.81  .         Q         . V        .         .
  16.000    117.1454    283.81  .         . Q       . V        .         .
  16.083    119.7175    373.47  .         .     Q   .  V       .         .
  16.167    123.4031    535.15  .         .         .  Q       .         .
  16.250    128.3809    722.78  .         .         .   V      . Q       .
  16.333    133.9969    815.44  .         .         .    V     .     Q   .
  16.417    139.4693    794.60  .         .         .      V   .    Q    .
  16.500    143.8233    632.19  .         .         .      VQ  .         .
  16.583    147.0176    463.82  .         .        Q       V  .         .
  16.667    149.4335    350.80  .         .    Q   .       V  .         .
  16.750    151.3691    281.05  .         . Q      .        V.         .
  16.833    152.9881    235.07  .         Q        .        V.         .
  16.917    154.4100    206.46  .        Q.        .        V.         .
  17.000    155.7378    192.80  .       Q .        .         V         .
  17.083    156.9833    180.85  .       Q .        .         V         .
  17.167    158.1342    167.10  .      Q  .        .         V         .
  17.250    159.2068    155.75  .     Q   .        .         V         .
  17.333    160.2184    146.87  .     Q   .        .         .V        .
  17.417    161.1837    140.17  .     Q   .        .         .V        .
  17.500    162.1097    134.45  .    Q    .        .         .V        .
  17.583    163.0021    129.57  .    Q    .        .         .V        .
  17.667    163.8651    125.31  .    Q    .        .         .V        .
  17.750    164.7022    121.55  .    Q    .        .         .V        .
  17.833    165.5161    118.18  .    Q    .        .         . V       .
  17.917    166.3089    115.12  .    Q    .        .         . V       .
  18.000    167.0824    112.30  .   Q     .        .         . V       .
  18.083    167.8382    109.75  .   Q     .        .         . V       .
  18.167    168.5788    107.54  .   Q     .        .         . V       .
  18.250    169.3071    105.75  .   Q     .        .         . V       .
  18.333    170.0250    104.24  .   Q     .        .         . V       .
  18.417    170.7337    102.91  .   Q     .        .         .  V      .
  18.500    171.4329    101.51  .   Q     .        .         .  V      .
  18.583    172.1218    100.04  .   Q     .        .         .  V      .
  18.667    172.8005     98.54  .   Q     .        .         .  V      .
  18.750    173.4690     97.07  .   Q     .        .         .  V      .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      225.0     450.0     675.0     900.0
--------------------------------------------------------------------------------
  18.833    174.1276     95.63  .   Q     .         .         .  V      .
  18.917    174.7767     94.25  .   Q     .         .         .  V      .
  19.000    175.4167     92.93  .   Q     .         .         .   V     .
  19.083    176.0480     91.67  .   Q     .         .         .   V     .
  19.167    176.6710     90.45  .   Q     .         .         .   V     .
  19.250    177.2859     89.29  .  Q      .         .         .   V     .
  19.333    177.8932     88.18  .  Q      .         .         .   V     .
  19.417    178.4931     87.10  .  Q      .         .         .   V     .
  19.500    179.0859     86.08  .  Q      .         .         .   V     .
  19.583    179.6719     85.09  .  Q      .         .         .   V     .
  19.667    180.2513     84.13  .  Q      .         .         .   V     .
  19.750    180.8244     83.21  .  Q      .         .         .    V    .
  19.833    181.3914     82.33  .  Q      .         .         .    V    .
  19.917    181.9525     81.47  .  Q      .         .         .    V    .
  20.000    182.5079     80.65  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                          1205.0
            10%                           630.0
            20%                           135.0
            30%                            55.0
            40%                            40.0
            50%                            30.0
            60%                            25.0
            70%                            20.0
            80%                            15.0
            90%                            10.0


********************************************************************************
  FLOW PROCESS FROM NODE   251.00 TO NODE   361.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 3 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   361.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
       (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      250.0     500.0     750.0    1000.0
----------------------------------------------------------------------------
  15.000    118.1230    197.18  .      Q  .        V.          .          .
  15.083    119.5187    202.65  .       Q .        V.          .          .
  15.167    120.9552    208.58  .       Q .        V.          .          .
  15.250    122.4374    215.21  .       Q .         V          .          .
  15.333    123.9699    222.53  .       Q .         V          .          .
  15.417    125.5549    230.13  .        Q.         V          .          .
  15.500    127.1829    236.40  .        Q.         V          .          .
  15.583    128.8404    240.67  .        Q.         .V         .          .
  15.667    130.5252    244.63  .        Q.         .V         .          .
  15.750    132.2543    251.07  .         Q         .V         .          .
  15.833    134.0750    264.36  .         Q         . V        .          .
  15.917    136.0686    289.48  .         .Q        . V        .          .
  16.000    138.3818    335.87  .         .  Q      . V        .          .
  16.083    141.4305    442.68  .         .      Q  .  V       .          .
  16.167    145.8109    636.02  .         .         .  V Q     .          .
  16.250    151.7282    859.20  .         .         .   V      .   Q      .
  16.333    158.4046    969.42  .         .         .     V    .       Q .
  16.417    164.8909    941.81  .         .         .      V   .      Q  .
  16.500    170.0120    743.58  .         .         .      V Q.         .
  16.583    173.7589    544.05  .         .        .Q      V .          .
  16.667    176.5945    411.72  .         .     Q  .       V .          .
  16.750    178.8647    329.63  .         .  Q      .        V.          .
  16.833    180.7620    275.49  .         .Q        .        V.          .
  16.917    182.4393    243.54  .        Q.         .        V.          .
  17.000    184.0065    227.55  .        Q.         .         V          .
  17.083    185.4743    213.13  .       Q .         .         V          .
  17.167    186.8263    196.30  .      Q  .         .         V          .
  17.250    188.0894    183.40  .      Q  .         .         V          .
  17.333    189.2822    173.20  .     Q   .         .         .V         .
  17.417    190.4208    165.32  .     Q   .         .         .V         .
  17.500    191.5131    158.60  .     Q   .         .         .V         .
  17.583    192.5658    152.86  .     Q   .         .         .V         .
  17.667    193.5840    147.85  .    Q    .         .         .V         .
  17.750    194.5718    143.42  .    Q    .         .         .V         .
  17.833    195.5322    139.45  .    Q    .         .         . V        .
  17.917    196.4678    135.85  .    Q    .         .         . V        .
  18.000    197.3806    132.53  .    Q    .         .         . V        .
  18.083    198.2726    129.52  .    Q    .         .         . V        .
  18.167    199.1467    126.93  .    Q    .         .         . V        .
  18.250    200.0063    124.81  .   Q     .         .         . V        .
  18.333    200.8538    123.05  .   Q     .         .         . V        .
  18.417    201.6904    121.48  .   Q     .         .         .  V       .
  18.500    202.5157    119.83  .   Q     .         .         .  V       .
  18.583    203.3290    118.09  .   Q     .         .         .  V       .
  18.667    204.1302    116.33  .   Q     .         .         .  V       .
  18.750    204.9193    114.58  .   Q     .         .         .  V       .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      250.0     500.0     750.0    1000.0
--------------------------------------------------------------------------------
  18.833    205.6968    112.89  .   Q     .         .         .  V      .
  18.917    206.4630    111.25  .   Q     .         .         .  V      .
  19.000    207.2185    109.70  .   Q     .         .         .   V     .
  19.083    207.9638    108.21  .   Q     .         .         .   V     .
  19.167    208.6992    106.78  .   Q     .         .         .   V     .
  19.250    209.4251    105.41  .   Q     .         .         .   V     .
  19.333    210.1420    104.09  .   Q     .         .         .   V     .
  19.417    210.8502    102.83  .   Q     .         .         .   V     .
  19.500    211.5501    101.62  .   Q     .         .         .   V     .
  19.583    212.2419    100.45  .   Q     .         .         .   V     .
  19.667    212.9259     99.32  .  Q      .         .         .   V     .
  19.750    213.6025     98.24  .  Q      .         .         .    V    .
  19.833    214.2718     97.19  .  Q      .         .         .    V    .
  19.917    214.9343     96.18  .  Q      .         .         .    V    .
  20.000    215.5900     95.21  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================              =========
             0%                         1205.0
            10%                          625.0
            20%                          135.0
            30%                           50.0
            40%                           40.0
            50%                           30.0
            60%                           25.0
            70%                           20.0
            80%                           15.0
            90%                           10.0


********************************************************************************
  FLOW PROCESS FROM NODE   361.00 TO NODE   431.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>STREAM NUMBER 4 ADDED TO STREAM NUMBER 1<<<<<
================================================================================
```

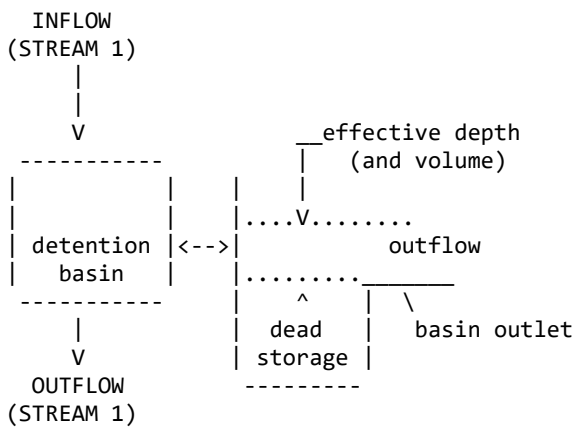
```
**************************************************************************
  FLOW PROCESS FROM NODE   431.00 TO NODE   431.00 IS CODE =  11
--------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
==========================================================================

           STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
--------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      300.0     600.0     900.0    1200.0
--------------------------------------------------------------------------
  15.000    133.4809    223.13  .      Q  .        V.          .          .
  15.083    135.0604    229.34  .      Q  .        V.          .          .
  15.167    136.6865    236.12  .      Q  .        V.          .          .
  15.250    138.3646    243.66  .       Q .         V          .          .
  15.333    140.1003    252.02  .       Q .         V          .          .
  15.417    141.8954    260.65  .       Q .         V          .          .
  15.500    143.7382    267.57  .       Q .         V          .          .
  15.583    145.6121    272.09  .        Q.         .V         .          .
  15.667    147.5155    276.38  .        Q.         .V         .          .
  15.750    149.4723    284.12  .        Q.         .V         .          .
  15.833    151.5384    300.00  .        Q.         . V        .          .
  15.917    153.8070    329.41  .         Q         . V        .          .
  16.000    156.4510    383.91  .         . Q       . V        .          .
  16.083    159.9561    508.94  .         .     Q   .  V       .          .
  16.167    165.0434    738.68  .         .         .   Q      .          .
  16.250    171.8785    992.46  .         .         .    V     .  Q       .
  16.333    179.4996   1106.58  .         .         .     V    .     Q    .
  16.417    186.6903   1044.09  .         .         .      V   .   Q      .
  16.500    192.2809    811.76  .         .         .      Q   .          .
  16.583    196.3660    593.15  .         .        Q.       V  .          .
  16.667    199.4651    449.99  .         .   Q     .        V.          .
  16.750    201.9681    363.43  .         . Q       .        V.          .
  16.833    204.0793    306.56  .        Q          .        V.          .
  16.917    205.9523    271.95  .        Q.         .        V.          .
  17.000    207.7004    253.82  .       Q .         .         V          .
  17.083    209.3381    237.79  .      Q  .         .         V          .
  17.167    210.8514    219.74  .      Q  .         .         V          .
  17.250    212.2682    205.71  .     Q   .         .         V          .
  17.333    213.6074    194.46  .     Q   .         .         .V         .
  17.417    214.8864    185.71  .     Q   .         .         .V         .
  17.500    216.1141    178.25  .    Q    .         .         .V         .
  17.583    217.2978    171.87  .    Q    .         .         .V         .
  17.667    218.4432    166.31  .    Q    .         .         .V         .
  17.750    219.5546    161.38  .    Q    .         .         .V         .
  17.833    220.6355    156.95  .    Q    .         .         . V        .
  17.917    221.6886    152.92  .    Q    .         .         . V        .
  18.000    222.7162    149.21  .   Q     .         .         . V        .
  18.083    223.7206    145.84  .   Q     .         .         . V        .
  18.167    224.7052    142.97  .   Q     .         .         . V        .
  18.250    225.6738    140.64  .   Q     .         .         . V        .
  18.333    226.6291    138.70  .   Q     .         .         . V        .
  18.417    227.5721    136.93  .   Q     .         .         .  V       .
  18.500    228.5023    135.06  .   Q     .         .         .  V       .
  18.583    229.4189    133.09  .   Q     .         .         .  V       .
  18.667    230.3217    131.09  .   Q     .         .         .  V       .
  18.750    231.2111    129.13  .   Q     .         .         .  V       .
```

```
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.      300.0     600.0     900.0    1200.0
--------------------------------------------------------------------------------
  18.833    232.0873    127.22  .   Q     .         .         .  V      .
  18.917    232.9508    125.39  .   Q     .         .         .  V      .
  19.000    233.8023    123.64  .   Q     .         .         .   V     .
  19.083    234.6423    121.97  .   Q     .         .         .   V     .
  19.167    235.4713    120.36  .   Q     .         .         .   V     .
  19.250    236.2896    118.82  .  Q      .         .         .   V     .
  19.333    237.0977    117.34  .  Q      .         .         .   V     .
  19.417    237.8960    115.92  .  Q      .         .         .   V     .
  19.500    238.6850    114.55  .  Q      .         .         .   V     .
  19.583    239.4649    113.24  .  Q      .         .         .   V     .
  19.667    240.2361    111.98  .  Q      .         .         .   V     .
  19.750    240.9989    110.76  .  Q      .         .         .    V    .
  19.833    241.7536    109.58  .  Q      .         .         .    V    .
  19.917    242.5005    108.45  .  Q      .         .         .    V    .
  20.000    243.2398    107.35  .  Q      .         .         .    V    .
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated               Duration
       Peak Flow Rate                    (minutes)
   ======================                =========
             0%                           1205.0
            10%                            605.0
            20%                            130.0
            30%                             50.0
            40%                             40.0
            50%                             30.0
            60%                             25.0
            70%                             20.0
            80%                             15.0
            90%                             10.0
```

```
**************************************************************************
  FLOW PROCESS FROM NODE    91.00 TO NODE    91.00 IS CODE = 3.1
--------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========================================================================
```




```
ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
  DEAD STORAGE(AF) =      0.000
  SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
  SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      1.293
  DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.00


BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

 INTERVAL    DEPTH      OUTFLOW     STORAGE
  NUMBER      (FT)       (CFS)       (AF)
      1       0.00        0.00       0.000
      2       0.50        9.00       0.520
      3       1.00       25.00       1.080
      4       1.50       45.00       1.690
      5       2.00       62.00       2.340
      6       2.50       78.00       3.050
      7       3.00       92.00       3.800
      8       4.00      115.00       5.510
      9       5.00      134.00       8.200
     10       6.00      150.00      11.960
     11       7.00      166.00      16.170
     12       8.00      179.00      20.740
     13       9.00      192.00      25.640
     14      10.00      204.00      30.860
     15      12.00      226.00      42.220
     16      14.00      246.00      54.510
     17      14.50      251.00      57.740
     18      16.00      265.00      68.140
```

```
================================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)
```

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 0.083 | 0.000 | 1.31 | 0.00 | 1.02 | 28.9 | 1.103 |
| 0.167 | 0.000 | 7.20 | 0.00 | 0.92 | 24.1 | 0.987 |
| 0.250 | 0.000 | 19.57 | 0.00 | 0.90 | 22.1 | 0.970 |
| 0.333 | 0.000 | 35.77 | 0.00 | 0.98 | 23.1 | 1.057 |
| 0.417 | 0.000 | 51.92 | 0.00 | 1.12 | 27.1 | 1.228 |
| 0.500 | 0.000 | 63.06 | 0.00 | 1.29 | 33.2 | 1.433 |
| 0.583 | 0.000 | 69.41 | 0.00 | 1.46 | 39.9 | 1.637 |
| 0.667 | 0.000 | 72.89 | 0.00 | 1.60 | 45.9 | 1.823 |
| 0.750 | 0.000 | 74.81 | 0.00 | 1.73 | 50.6 | 1.989 |
| 0.833 | 0.000 | 75.78 | 0.00 | 1.84 | 54.7 | 2.134 |
| 0.917 | 0.000 | 76.31 | 0.00 | 1.94 | 58.2 | 2.259 |
| 1.000 | 0.000 | 76.81 | 0.00 | 2.02 | 61.2 | 2.366 |
| 1.083 | 0.000 | 77.27 | 0.00 | 2.08 | 63.6 | 2.460 |
| 1.167 | 0.000 | 77.57 | 0.00 | 2.14 | 65.6 | 2.542 |
| 1.250 | 0.000 | 77.79 | 0.00 | 2.19 | 67.4 | 2.614 |
| 1.333 | 0.000 | 77.98 | 0.00 | 2.24 | 68.9 | 2.677 |
| 1.417 | 0.000 | 78.17 | 0.00 | 2.28 | 70.2 | 2.731 |
| 1.500 | 0.000 | 78.36 | 0.00 | 2.31 | 71.4 | 2.780 |
| 1.583 | 0.000 | 78.55 | 0.00 | 2.34 | 72.4 | 2.822 |
| 1.667 | 0.000 | 78.74 | 0.00 | 2.37 | 73.3 | 2.860 |
| 1.750 | 0.000 | 78.93 | 0.00 | 2.39 | 74.1 | 2.893 |
| 1.833 | 0.000 | 79.13 | 0.00 | 2.41 | 74.8 | 2.923 |
| 1.917 | 0.000 | 79.33 | 0.00 | 2.43 | 75.4 | 2.950 |
| 2.000 | 0.000 | 79.53 | 0.00 | 2.45 | 76.0 | 2.974 |
| 2.083 | 0.000 | 79.73 | 0.00 | 2.46 | 76.5 | 2.996 |
| 2.167 | 0.000 | 79.93 | 0.00 | 2.48 | 77.0 | 3.016 |
| 2.250 | 0.000 | 80.14 | 0.00 | 2.49 | 77.4 | 3.035 |
| 2.333 | 0.000 | 80.34 | 0.00 | 2.50 | 77.8 | 3.052 |
| 2.417 | 0.000 | 80.55 | 0.00 | 2.51 | 78.2 | 3.068 |
| 2.500 | 0.000 | 80.76 | 0.00 | 2.52 | 78.5 | 3.084 |
| 2.583 | 0.000 | 80.97 | 0.00 | 2.53 | 78.8 | 3.099 |
| 2.667 | 0.000 | 81.18 | 0.00 | 2.54 | 79.0 | 3.114 |
| 2.750 | 0.000 | 81.40 | 0.00 | 2.55 | 79.3 | 3.128 |
| 2.833 | 0.000 | 81.61 | 0.00 | 2.56 | 79.6 | 3.142 |
| 2.917 | 0.000 | 81.83 | 0.00 | 2.57 | 79.8 | 3.156 |
| 3.000 | 0.000 | 82.05 | 0.00 | 2.58 | 80.1 | 3.169 |
| 3.083 | 0.000 | 82.28 | 0.00 | 2.59 | 80.3 | 3.182 |
| 3.167 | 0.000 | 82.50 | 0.00 | 2.60 | 80.6 | 3.195 |
| 3.250 | 0.000 | 82.73 | 0.00 | 2.61 | 80.8 | 3.208 |
| 3.333 | 0.000 | 82.95 | 0.00 | 2.61 | 81.1 | 3.221 |
| 3.417 | 0.000 | 83.19 | 0.00 | 2.62 | 81.3 | 3.234 |
| 3.500 | 0.000 | 83.42 | 0.00 | 2.63 | 81.6 | 3.247 |
| 3.583 | 0.000 | 83.65 | 0.00 | 2.64 | 81.8 | 3.260 |
| 3.667 | 0.000 | 83.89 | 0.00 | 2.65 | 82.0 | 3.273 |
| 3.750 | 0.000 | 84.13 | 0.00 | 2.66 | 82.3 | 3.285 |
| 3.833 | 0.000 | 84.37 | 0.00 | 2.67 | 82.5 | 3.298 |
| 3.917 | 0.000 | 84.62 | 0.00 | 2.67 | 82.8 | 3.311 |
| 4.000 | 0.000 | 84.86 | 0.00 | 2.68 | 83.0 | 3.324 |
| 4.083 | 0.000 | 85.11 | 0.00 | 2.69 | 83.2 | 3.337 |
| 4.167 | 0.000 | 85.36 | 0.00 | 2.70 | 83.5 | 3.350 |

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 4.250 | 0.000 | 85.62 | 0.00 | 2.71 | 83.7 | 3.363 |
| 4.333 | 0.000 | 85.87 | 0.00 | 2.72 | 84.0 | 3.376 |
| 4.417 | 0.000 | 86.13 | 0.00 | 2.73 | 84.2 | 3.389 |
| 4.500 | 0.000 | 86.39 | 0.00 | 2.74 | 84.5 | 3.403 |
| 4.583 | 0.000 | 86.66 | 0.00 | 2.74 | 84.7 | 3.416 |
| 4.667 | 0.000 | 86.93 | 0.00 | 2.75 | 85.0 | 3.430 |
| 4.750 | 0.000 | 87.20 | 0.00 | 2.76 | 85.2 | 3.443 |
| 4.833 | 0.000 | 87.47 | 0.00 | 2.77 | 85.5 | 3.457 |
| 4.917 | 0.000 | 87.74 | 0.00 | 2.78 | 85.7 | 3.471 |
| 5.000 | 0.000 | 88.02 | 0.00 | 2.79 | 86.0 | 3.485 |
| 5.083 | 0.000 | 88.30 | 0.00 | 2.80 | 86.3 | 3.499 |
| 5.167 | 0.000 | 88.59 | 0.00 | 2.81 | 86.5 | 3.513 |
| 5.250 | 0.000 | 88.87 | 0.00 | 2.82 | 86.8 | 3.528 |
| 5.333 | 0.000 | 89.16 | 0.00 | 2.83 | 87.1 | 3.542 |
| 5.417 | 0.000 | 89.46 | 0.00 | 2.84 | 87.3 | 3.557 |
| 5.500 | 0.000 | 89.75 | 0.00 | 2.85 | 87.6 | 3.572 |
| 5.583 | 0.000 | 90.05 | 0.00 | 2.86 | 87.9 | 3.587 |
| 5.667 | 0.000 | 90.36 | 0.00 | 2.87 | 88.2 | 3.602 |
| 5.750 | 0.000 | 90.66 | 0.00 | 2.88 | 88.4 | 3.617 |
| 5.833 | 0.000 | 90.97 | 0.00 | 2.89 | 88.7 | 3.633 |
| 5.917 | 0.000 | 91.29 | 0.00 | 2.90 | 89.0 | 3.648 |
| 6.000 | 0.000 | 91.60 | 0.00 | 2.91 | 89.3 | 3.664 |
| 6.083 | 0.000 | 91.92 | 0.00 | 2.92 | 89.6 | 3.680 |
| 6.167 | 0.000 | 92.25 | 0.00 | 2.93 | 89.9 | 3.696 |
| 6.250 | 0.000 | 92.58 | 0.00 | 2.94 | 90.2 | 3.712 |
| 6.333 | 0.000 | 92.91 | 0.00 | 2.95 | 90.5 | 3.729 |
| 6.417 | 0.000 | 93.25 | 0.00 | 2.96 | 90.8 | 3.745 |
| 6.500 | 0.000 | 93.58 | 0.00 | 2.97 | 91.1 | 3.762 |
| 6.583 | 0.000 | 93.93 | 0.00 | 2.99 | 91.5 | 3.779 |
| 6.667 | 0.000 | 94.28 | 0.00 | 3.00 | 91.8 | 3.797 |
| 6.750 | 0.000 | 94.63 | 0.00 | 3.01 | 92.1 | 3.814 |
| 6.833 | 0.000 | 94.99 | 0.00 | 3.02 | 92.3 | 3.833 |
| 6.917 | 0.000 | 95.35 | 0.00 | 3.03 | 92.6 | 3.852 |
| 7.000 | 0.000 | 95.72 | 0.00 | 3.04 | 92.8 | 3.872 |
| 7.083 | 0.000 | 96.09 | 0.00 | 3.05 | 93.1 | 3.892 |
| 7.167 | 0.000 | 96.46 | 0.00 | 3.07 | 93.4 | 3.913 |
| 7.250 | 0.000 | 96.85 | 0.00 | 3.08 | 93.7 | 3.935 |
| 7.333 | 0.000 | 97.23 | 0.00 | 3.09 | 94.0 | 3.958 |
| 7.417 | 0.000 | 97.62 | 0.00 | 3.11 | 94.3 | 3.981 |
| 7.500 | 0.000 | 98.02 | 0.00 | 3.12 | 94.6 | 4.004 |
| 7.583 | 0.000 | 98.42 | 0.00 | 3.13 | 94.9 | 4.029 |
| 7.667 | 0.000 | 98.83 | 0.00 | 3.15 | 95.2 | 4.053 |
| 7.750 | 0.000 | 99.24 | 0.00 | 3.16 | 95.6 | 4.078 |
| 7.833 | 0.000 | 99.66 | 0.00 | 3.18 | 95.9 | 4.104 |
| 7.917 | 0.000 | 100.08 | 0.00 | 3.19 | 96.3 | 4.130 |
| 8.000 | 0.000 | 100.51 | 0.00 | 3.21 | 96.6 | 4.157 |
| 8.083 | 0.000 | 100.95 | 0.00 | 3.22 | 97.0 | 4.185 |
| 8.167 | 0.000 | 101.39 | 0.00 | 3.24 | 97.4 | 4.212 |
| 8.250 | 0.000 | 101.84 | 0.00 | 3.26 | 97.7 | 4.241 |
| 8.333 | 0.000 | 102.30 | 0.00 | 3.27 | 98.1 | 4.269 |

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 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)
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| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 8.417 | 0.000 | 102.76 | 0.00 | 3.29 | 98.5 | 4.299 |
| 8.500 | 0.000 | 103.23 | 0.00 | 3.31 | 98.9 | 4.328 |
| 8.583 | 0.000 | 103.71 | 0.00 | 3.33 | 99.3 | 4.359 |
| 8.667 | 0.000 | 104.19 | 0.00 | 3.34 | 99.7 | 4.389 |
| 8.750 | 0.000 | 104.68 | 0.00 | 3.36 | 100.1 | 4.421 |
| 8.833 | 0.000 | 105.18 | 0.00 | 3.38 | 100.6 | 4.453 |
| 8.917 | 0.000 | 105.69 | 0.00 | 3.40 | 101.0 | 4.485 |
| 9.000 | 0.000 | 106.21 | 0.00 | 3.42 | 101.4 | 4.518 |
| 9.083 | 0.000 | 106.73 | 0.00 | 3.44 | 101.9 | 4.551 |
| 9.167 | 0.000 | 107.26 | 0.00 | 3.46 | 102.3 | 4.585 |
| 9.250 | 0.000 | 107.81 | 0.00 | 3.48 | 102.8 | 4.620 |
| 9.333 | 0.000 | 108.36 | 0.00 | 3.50 | 103.3 | 4.655 |
| 9.417 | 0.000 | 108.92 | 0.00 | 3.52 | 103.7 | 4.690 |
| 9.500 | 0.000 | 109.49 | 0.00 | 3.54 | 104.2 | 4.727 |
| 9.583 | 0.000 | 110.07 | 0.00 | 3.56 | 104.7 | 4.764 |
| 9.667 | 0.000 | 110.66 | 0.00 | 3.59 | 105.2 | 4.801 |
| 9.750 | 0.000 | 111.26 | 0.00 | 3.61 | 105.7 | 4.839 |
| 9.833 | 0.000 | 111.87 | 0.00 | 3.63 | 106.2 | 4.878 |
| 9.917 | 0.000 | 112.50 | 0.00 | 3.65 | 106.8 | 4.918 |
| 10.000 | 0.000 | 113.13 | 0.00 | 3.68 | 107.3 | 4.958 |
| 10.083 | 0.000 | 113.78 | 0.00 | 3.70 | 107.8 | 4.998 |
| 10.167 | 0.000 | 114.43 | 0.00 | 3.73 | 108.4 | 5.040 |
| 10.250 | 0.000 | 115.11 | 0.00 | 3.75 | 109.0 | 5.082 |
| 10.333 | 0.000 | 115.79 | 0.00 | 3.78 | 109.5 | 5.125 |
| 10.417 | 0.000 | 116.49 | 0.00 | 3.80 | 110.1 | 5.169 |
| 10.500 | 0.000 | 117.20 | 0.00 | 3.83 | 110.7 | 5.214 |
| 10.583 | 0.000 | 117.93 | 0.00 | 3.85 | 111.3 | 5.260 |
| 10.667 | 0.000 | 118.67 | 0.00 | 3.88 | 111.9 | 5.306 |
| 10.750 | 0.000 | 119.44 | 0.00 | 3.91 | 112.6 | 5.353 |
| 10.833 | 0.000 | 120.21 | 0.00 | 3.94 | 113.2 | 5.401 |
| 10.917 | 0.000 | 121.00 | 0.00 | 3.97 | 113.9 | 5.450 |
| 11.000 | 0.000 | 121.81 | 0.00 | 3.99 | 114.5 | 5.501 |
| 11.083 | 0.000 | 122.64 | 0.00 | 4.02 | 115.1 | 5.553 |
| 11.167 | 0.000 | 123.48 | 0.00 | 4.04 | 115.5 | 5.608 |
| 11.250 | 0.000 | 124.35 | 0.00 | 4.06 | 115.9 | 5.666 |
| 11.333 | 0.000 | 125.23 | 0.00 | 4.08 | 116.3 | 5.727 |
| 11.417 | 0.000 | 126.15 | 0.00 | 4.10 | 116.8 | 5.792 |
| 11.500 | 0.000 | 127.07 | 0.00 | 4.13 | 117.2 | 5.860 |
| 11.583 | 0.000 | 128.03 | 0.00 | 4.16 | 117.7 | 5.931 |
| 11.667 | 0.000 | 129.00 | 0.00 | 4.18 | 118.2 | 6.005 |
| 11.750 | 0.000 | 130.01 | 0.00 | 4.21 | 118.8 | 6.082 |
| 11.833 | 0.000 | 131.03 | 0.00 | 4.24 | 119.3 | 6.163 |
| 11.917 | 0.000 | 132.09 | 0.00 | 4.27 | 119.9 | 6.247 |
| 12.000 | 0.000 | 133.17 | 0.00 | 4.31 | 120.5 | 6.334 |
| 12.083 | 0.000 | 134.22 | 0.00 | 4.34 | 121.1 | 6.424 |
| 12.167 | 0.000 | 135.07 | 0.00 | 4.37 | 121.8 | 6.516 |
| 12.250 | 0.000 | 135.63 | 0.00 | 4.41 | 122.4 | 6.607 |
| 12.333 | 0.000 | 136.02 | 0.00 | 4.44 | 123.1 | 6.696 |
| 12.417 | 0.000 | 136.46 | 0.00 | 4.47 | 123.7 | 6.784 |
| 12.500 | 0.000 | 137.20 | 0.00 | 4.51 | 124.3 | 6.873 |

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 12.583 | 0.000 | 138.22 | 0.00 | 4.54 | 124.9 | 6.964 |
| 12.667 | 0.000 | 139.43 | 0.00 | 4.58 | 125.6 | 7.059 |
| 12.750 | 0.000 | 140.78 | 0.00 | 4.61 | 126.3 | 7.159 |
| 12.833 | 0.000 | 142.21 | 0.00 | 4.65 | 127.0 | 7.264 |
| 12.917 | 0.000 | 143.73 | 0.00 | 4.69 | 127.8 | 7.373 |
| 13.000 | 0.000 | 145.29 | 0.00 | 4.74 | 128.6 | 7.489 |
| 13.083 | 0.000 | 146.92 | 0.00 | 4.78 | 129.4 | 7.609 |
| 13.167 | 0.000 | 148.61 | 0.00 | 4.83 | 130.3 | 7.735 |
| 13.250 | 0.000 | 150.38 | 0.00 | 4.88 | 131.2 | 7.868 |
| 13.333 | 0.000 | 152.21 | 0.00 | 4.93 | 132.1 | 8.006 |
| 13.417 | 0.000 | 154.13 | 0.00 | 4.98 | 133.1 | 8.150 |
| 13.500 | 0.000 | 156.11 | 0.00 | 5.03 | 134.0 | 8.302 |
| 13.583 | 0.000 | 158.20 | 0.00 | 5.07 | 134.8 | 8.464 |
| 13.667 | 0.000 | 160.36 | 0.00 | 5.12 | 135.5 | 8.635 |
| 13.750 | 0.000 | 162.64 | 0.00 | 5.16 | 136.2 | 8.817 |
| 13.833 | 0.000 | 165.01 | 0.00 | 5.22 | 137.0 | 9.010 |
| 13.917 | 0.000 | 167.51 | 0.00 | 5.27 | 137.9 | 9.214 |
| 14.000 | 0.000 | 170.12 | 0.00 | 5.33 | 138.8 | 9.429 |
| 14.083 | 0.000 | 172.98 | 0.00 | 5.39 | 139.7 | 9.659 |
| 14.167 | 0.000 | 176.33 | 0.00 | 5.45 | 140.7 | 9.904 |
| 14.250 | 0.000 | 180.36 | 0.00 | 5.52 | 141.8 | 10.169 |
| 14.333 | 0.000 | 184.84 | 0.00 | 5.60 | 143.0 | 10.457 |
| 14.417 | 0.000 | 189.52 | 0.00 | 5.68 | 144.3 | 10.769 |
| 14.500 | 0.000 | 194.01 | 0.00 | 5.77 | 145.6 | 11.102 |
| 14.583 | 0.000 | 198.39 | 0.00 | 5.87 | 147.1 | 11.455 |
| 14.667 | 0.000 | 202.78 | 0.00 | 5.96 | 148.6 | 11.828 |
| 14.750 | 0.000 | 207.39 | 0.00 | 6.06 | 150.2 | 12.222 |
| 14.833 | 0.000 | 212.24 | 0.00 | 6.16 | 151.8 | 12.638 |
| 14.917 | 0.000 | 217.48 | 0.00 | 6.27 | 153.4 | 13.080 |
| 15.000 | 0.000 | 223.13 | 0.00 | 6.38 | 155.1 | 13.548 |
| 15.083 | 0.000 | 229.34 | 0.00 | 6.50 | 157.0 | 14.046 |
| 15.167 | 0.000 | 236.12 | 0.00 | 6.62 | 158.9 | 14.578 |
| 15.250 | 0.000 | 243.66 | 0.00 | 6.76 | 161.0 | 15.147 |
| 15.333 | 0.000 | 252.02 | 0.00 | 6.90 | 163.3 | 15.758 |
| 15.417 | 0.000 | 260.65 | 0.00 | 7.05 | 165.6 | 16.413 |
| 15.500 | 0.000 | 267.57 | 0.00 | 7.20 | 167.7 | 17.101 |
| 15.583 | 0.000 | 272.09 | 0.00 | 7.36 | 169.7 | 17.806 |
| 15.667 | 0.000 | 276.38 | 0.00 | 7.52 | 171.7 | 18.527 |
| 15.750 | 0.000 | 284.12 | 0.00 | 7.68 | 173.8 | 19.287 |
| 15.833 | 0.000 | 300.00 | 0.00 | 7.87 | 176.1 | 20.141 |
| 15.917 | 0.000 | 329.41 | 0.00 | 8.09 | 178.7 | 21.178 |
| 16.000 | 0.000 | 383.91 | 0.00 | 8.37 | 182.0 | 22.569 |
| 16.083 | 0.000 | 508.94 | 0.00 | 8.83 | 186.8 | 24.788 |
| 16.167 | 0.000 | 738.68 | 0.00 | 9.56 | 194.2 | 28.537 |
| 16.250 | 0.000 | 992.46 | 0.00 | 10.55 | 204.3 | 33.965 |
| 16.333 | 0.000 | 1106.58 | 0.00 | 11.63 | 216.0 | 40.099 |
| 16.417 | 0.000 | 1044.09 | 0.00 | 12.57 | 226.8 | 45.728 |
| 16.500 | 0.000 | 811.76 | 0.00 | 13.22 | 234.9 | 49.700 |
| 16.583 | 0.000 | 593.15 | 0.00 | 13.61 | 240.2 | 52.131 |
| 16.667 | 0.000 | 449.99 | 0.00 | 13.84 | 243.3 | 53.555 |

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

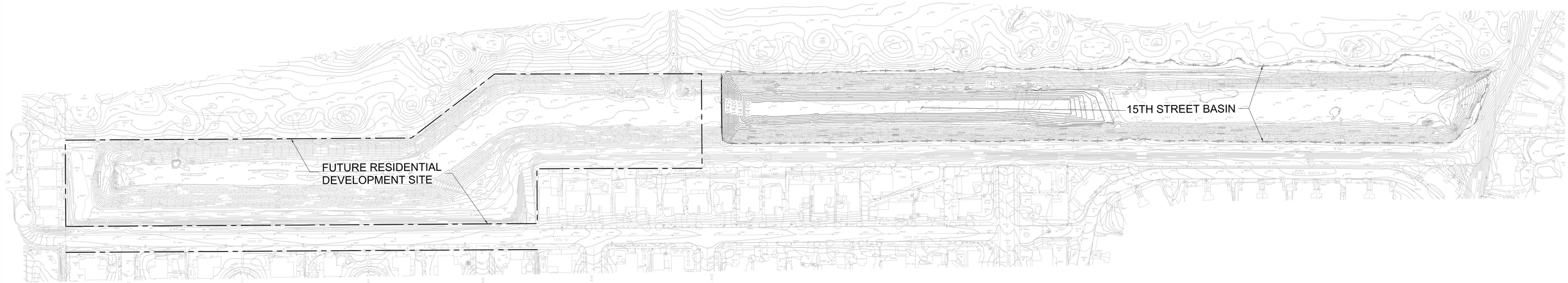
| CLOCK TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | LOSS (CFS) | EFFECTIVE DEPTH(FT) | MEAN OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|---|
| 16.750 | 0.000 | 363.43 | 0.00 | 13.98 | 245.1 | 54.370 |
| 16.833 | 0.000 | 306.56 | 0.00 | 14.04 | 246.1 | 54.786 |
| 16.917 | 0.000 | 271.95 | 0.00 | 14.07 | 246.6 | 54.961 |
| 17.000 | 0.000 | 253.82 | 0.00 | 14.08 | 246.7 | 55.010 |
| 17.083 | 0.000 | 237.79 | 0.00 | 14.07 | 246.7 | 54.948 |
| 17.167 | 0.000 | 219.74 | 0.00 | 14.04 | 246.5 | 54.764 |
| 17.250 | 0.000 | 205.71 | 0.00 | 14.00 | 246.2 | 54.485 |
| 17.333 | 0.000 | 194.46 | 0.00 | 13.94 | 245.7 | 54.132 |
| 17.417 | 0.000 | 185.71 | 0.00 | 13.87 | 245.1 | 53.724 |
| 17.500 | 0.000 | 178.25 | 0.00 | 13.80 | 244.4 | 53.269 |
| 17.583 | 0.000 | 171.87 | 0.00 | 13.72 | 243.6 | 52.775 |
| 17.667 | 0.000 | 166.31 | 0.00 | 13.63 | 242.7 | 52.248 |
| 17.750 | 0.000 | 161.38 | 0.00 | 13.54 | 241.9 | 51.694 |
| 17.833 | 0.000 | 156.95 | 0.00 | 13.45 | 240.9 | 51.115 |
| 17.917 | 0.000 | 152.92 | 0.00 | 13.35 | 240.0 | 50.516 |
| 18.000 | 0.000 | 149.21 | 0.00 | 13.25 | 239.0 | 49.897 |
| 18.083 | 0.000 | 145.84 | 0.00 | 13.15 | 238.0 | 49.263 |
| 18.167 | 0.000 | 142.97 | 0.00 | 13.04 | 236.9 | 48.616 |
| 18.250 | 0.000 | 140.64 | 0.00 | 12.93 | 235.9 | 47.960 |
| 18.333 | 0.000 | 138.70 | 0.00 | 12.83 | 234.8 | 47.298 |
| 18.417 | 0.000 | 136.93 | 0.00 | 12.72 | 233.7 | 46.631 |
| 18.500 | 0.000 | 135.06 | 0.00 | 12.61 | 232.6 | 45.959 |
| 18.583 | 0.000 | 133.09 | 0.00 | 12.50 | 231.5 | 45.281 |
| 18.667 | 0.000 | 131.09 | 0.00 | 12.39 | 230.4 | 44.597 |
| 18.750 | 0.000 | 129.13 | 0.00 | 12.27 | 229.3 | 43.907 |
| 18.833 | 0.000 | 127.22 | 0.00 | 12.16 | 228.2 | 43.212 |
| 18.917 | 0.000 | 125.39 | 0.00 | 12.05 | 227.0 | 42.512 |
| 19.000 | 0.000 | 123.64 | 0.00 | 11.93 | 225.8 | 41.808 |
| 19.083 | 0.000 | 121.97 | 0.00 | 11.80 | 224.5 | 41.102 |
| 19.167 | 0.000 | 120.36 | 0.00 | 11.68 | 223.1 | 40.394 |
| 19.250 | 0.000 | 118.82 | 0.00 | 11.55 | 221.8 | 39.685 |
| 19.333 | 0.000 | 117.34 | 0.00 | 11.43 | 220.4 | 38.975 |
| 19.417 | 0.000 | 115.92 | 0.00 | 11.30 | 219.0 | 38.265 |
| 19.500 | 0.000 | 114.55 | 0.00 | 11.18 | 217.7 | 37.555 |
| 19.583 | 0.000 | 113.24 | 0.00 | 11.05 | 216.3 | 36.845 |
| 19.667 | 0.000 | 111.98 | 0.00 | 10.93 | 214.9 | 36.136 |
| 19.750 | 0.000 | 110.76 | 0.00 | 10.80 | 213.5 | 35.429 |
| 19.833 | 0.000 | 109.58 | 0.00 | 10.68 | 212.2 | 34.722 |
| 19.917 | 0.000 | 108.45 | 0.00 | 10.56 | 210.8 | 34.017 |
| 20.000 | 0.000 | 107.35 | 0.00 | 10.43 | 209.4 | 33.314 |
| 20.083 | 0.000 | 106.29 | 0.00 | 10.31 | 208.1 | 32.613 |
| 20.167 | 0.000 | 105.26 | 0.00 | 10.19 | 206.7 | 31.914 |
| 20.250 | 0.000 | 104.27 | 0.00 | 10.06 | 205.4 | 31.218 |
| 20.333 | 0.000 | 103.30 | 0.00 | 9.94 | 204.0 | 30.525 |
| 20.417 | 0.000 | 102.37 | 0.00 | 9.80 | 202.4 | 29.836 |
| 20.500 | 0.000 | 101.46 | 0.00 | 9.67 | 200.9 | 29.151 |
| 20.583 | 0.000 | 100.57 | 0.00 | 9.54 | 199.3 | 28.471 |
| 20.667 | 0.000 | 99.72 | 0.00 | 9.41 | 197.7 | 27.796 |
| 20.750 | 0.000 | 98.88 | 0.00 | 9.28 | 196.2 | 27.126 |
| 20.833 | 0.000 | 98.07 | 0.00 | 9.16 | 194.7 | 26.461 |

No change vs. 1-day event

```
================================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)

           CLOCK                                                  MEAN
            TIME  DEAD-STORAGE  INFLOW    LOSS   EFFECTIVE OUTFLOW  EFFECTIVE
           (HRS)   FILLED(AF)    (CFS)    (CFS)  DEPTH(FT)  (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
          20.917        0.000    97.28     0.00      9.03    193.1     25.801
          21.000        0.000    96.52     0.00      8.90    191.5     25.146
          21.083        0.000    95.77     0.00      8.77    189.8     24.499
          21.167        0.000    95.04     0.00      8.64    188.1     23.858
          21.250        0.000    94.32     0.00      8.51    186.4     23.223
          21.333        0.000    93.63     0.00      8.38    184.8     22.596
          21.417        0.000    92.95     0.00      8.25    183.1     21.975
          21.500        0.000    92.29     0.00      8.13    181.5     21.361
          21.583        0.000    91.64     0.00      8.00    179.8     20.753
          21.667        0.000    91.01     0.00      7.87    178.2     20.153
          21.750        0.000    90.39     0.00      7.74    176.5     19.560
          21.833        0.000    89.79     0.00      7.61    174.8     18.974
          21.917        0.000    89.20     0.00      7.49    173.2     18.396
          22.000        0.000    88.62     0.00      7.36    171.5     17.825
          22.083        0.000    88.05     0.00      7.24    169.9     17.262
          22.167        0.000    87.50     0.00      7.12    168.3     16.705
          22.250        0.000    86.96     0.00      7.00    166.7     16.156
          22.333        0.000    86.43     0.00      6.87    164.9     15.615
          22.417        0.000    85.90     0.00      6.74    162.9     15.085
          22.500        0.000    85.39     0.00      6.62    160.9     14.565
          22.583        0.000    84.89     0.00      6.50    158.9     14.055
          22.667        0.000    84.40     0.00      6.38    157.0     13.555
          22.750        0.000    83.92     0.00      6.26    155.1     13.064
          22.833        0.000    83.45     0.00      6.15    153.3     12.584
          22.917        0.000    82.98     0.00      6.04    151.5     12.112
          23.000        0.000    82.52     0.00      5.92    149.6     11.650
          23.083        0.000    82.08     0.00      5.80    147.7     11.198
          23.167        0.000    81.64     0.00      5.68    145.8     10.756
          23.250        0.000    81.20     0.00      5.56    144.0     10.323
          23.333        0.000    80.78     0.00      5.45    142.1      9.901
          23.417        0.000    80.36     0.00      5.34    140.4      9.488
          23.500        0.000    79.95     0.00      5.23    138.6      9.084
          23.583        0.000    79.55     0.00      5.13    136.9      8.688
          23.667        0.000    79.15     0.00      5.03    135.3      8.302
          23.750        0.000    78.76     0.00      4.90    133.3      7.927
          23.833        0.000    78.38     0.00      4.76    130.8      7.566
          23.917        0.000    78.00     0.00      4.64    128.3      7.219
--------------------------------------------------------------------------------
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =    274.884 AF
    BASIN  STORAGE =      0.000 AF (WITH      1.293 AF INITIALLY FILLED)
    OUTFLOW VOLUME =    276.177 AF
    LOSS    VOLUME =      0.000 AF
================================================================================

  END OF FLOODSCx ROUTING ANALYSIS
```




15th Street Basin
Contour Area Summary

| Contour Elevation | Contour Area (SF) |
|---|---|
| 1,410 | 28,041 |
| 1,411 | 35,419 |
| 1,412 | 43,125 |
| 1,413 | 50,900 |
| 1,414 | 59,252 |
| 1,415 | 68,060 |
| 1,416 | 80,313 |
| 1,417 | 153,858 |
| 1,418 | 174,365 |
| 1,419 | 191,932 |
| 1,420 | 206,332 |
| 1,421 | 220,511 |
| 1,422 | 234,422 |
| 1,423 | 247,242 |
| 1,424 | 260,417 |
| 1,425 | 274,808 |
| 1,426 | 288,823 |
| 1,427 | 301,973 |
| 1,428 | 315,143 |
| 1,429 | 332,430 |
| 1,430 | 363,465 |

Exhibit A

# PRELIMINARY GRADING
# 15TH STREET BASIN

100 0 100 200 300
SCALE IN FEET

PROACTIVE
ENGINEERING CONSULTANTS
1875 CALIFORNIA AVENUE, CORONA, CA • 92881
951•280•5300

JULY 31, 2018

Plotted: Jul 31, 2018 - 9:06am by: S_Gilbert
Drawing Name: Z:\10,031_Upland_Basin_Frontier\Drawings\Exhibits\Proposed Basin Areas.dwg

# APPENDIX G4:

# 15TH STREET BASIN MODIFICATIONS – SPILLWAY AND BYPASS ALTERNATIVES

# TECHNICAL MEMORANDUM

**To:** City of Upland JN 10.031.002

**From:** John McCarthy, PE, Tom Ryan, PE

**Date:** September 10, 2019

**Subject:** 15th Street Basin Modifications – Spillway and Bypass Alternatives

---

Q3 Consulting, a Proactive Engineering Consultants company, was contracted by Frontier Communities to evaluate and identify recommendations to the existing 15th Street basin to accommodate the proposed Tract 20245 development. A previous technical memorandum titled, "*15th Street Basin Modifications Review and Recommendations"* prepared by Q3 Consulting, dated July 31, 2018 identified the recommended modifications to the basin to accommodate the proposed development. That technical memorandum was reviewed and approved by the City of Upland.

The purpose of this technical memorandum is to provide an additional assessment of potential alternatives for the emergency spillway design and location, and to evaluate a potential bypass system on the westerly side of the project to limit the flow to the basin while still reducing the outflow discharge the required levels.

**Basin Bypass Analysis**

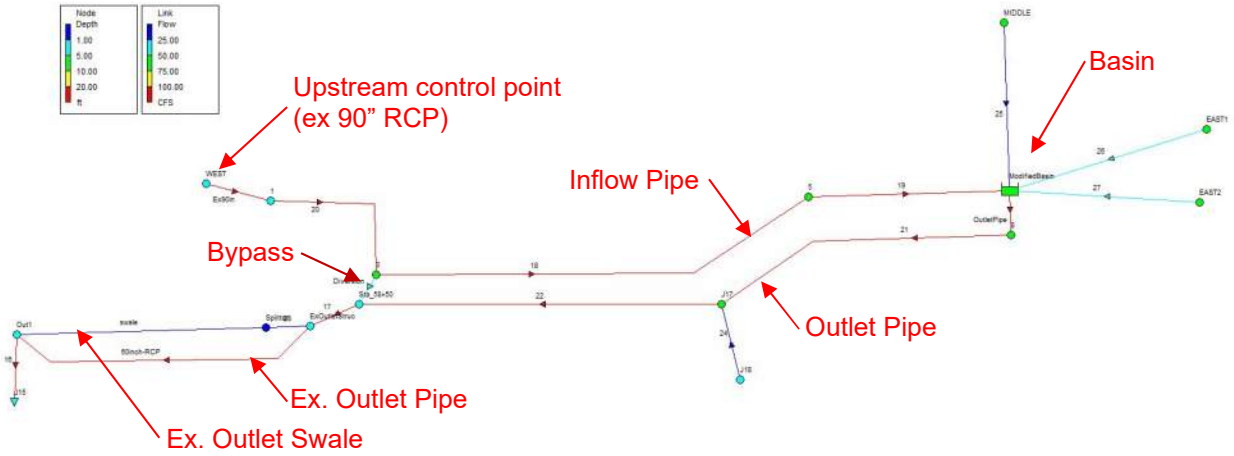
The proposed develop is located on the west side of the existing detention basin. In the current configuration, the main inflow and basin outlet systems are also located on the west side of the basin. The proposed development will require that the inflow and outlet storm drain systems be extended over 1,600 feet each to the new basin location. To potentially reduce the sizes of the inflow and outlet pipe systems a storm water bypass system was evaluated at the west side of the development. The bypass would divert flows (either low level flows or high level flows) directly to the existing outlet pipe system to potentially reduce the sizes of the new pipe systems.

To evaluate potential bypass systems and its effect on the basin design and inflow and outlet systems, the U.S. Environmental Protection Agency's (EPA) Storm Water Management Model (SWMM) was used for the analysis. The model performs advanced calculations, capable of analyzing split flows, surcharge, and flow reversals. The SWMM 5 model allows the user to model the entire network of pipes, basins, diversions in one comprehensive model. The benefit of this is quickly identifying whether or not an alternative functions or fails.

27042 Towne Centre Drive, Suite 110
Foothill Ranch, CA 92610
T: 949.259.6770
F: 949.716.7461

Multiple alternatives were performed for this project. The main areas of concern were the basin maximum water surface elevation (and its impact on the upstream existing and proposed drainage system), the upstream existing 90-inch RCP system (with its existing lateral connections), and the existing downstream flow splitting structure (pipe and swale). The configuration of the model is shown in Figure 1.

Figure 1 – SWMM 5 Model Configuration




These requirements associated with the existing system were as follows:

1) Maximum flow downstream of basin (Q100 = 248 cfs) in existing outlet pipe
2) Maximum HGL at upstream existing 90-inch RCP at junction of elevation 1427 (which was based on the original basin maximum WSE of 1423.73)
3) New basin maximum HGL of approximately 1426 feet

The SWMM 5 model is unique (compared to traditional models) in that it utilizes the volume of the conduits. But, the results of the models showed that not all three of these criteria could be met without adverse impacts. Due to the proposed basin reduction, the maximum WSE had to be increased to obtain the required flood mitigation. This raise in WSE adversely impacts the upstream existing 90-inch RCP's HGL. A diversion pipe was evaluated that allowed flows to bypass the basin. Multiple alternatives of the bypass were performed but with little overall improvement on the sizes of the proposed improvements due to the restrictions within the system identified above. Some benefit may potentially be realized in the overall models and it is recommended that a detailed analysis using SWMM 5 be performed during final design.

**Spillway Alternatives Analysis**

The basin and spillway shall be designed for the 1,000-year event (1.35 x 100-year flow rate) in accordance with San Bernardino County criteria. The required 1-foot of freeboard to the top of the dam embankment shall be above the 1,000-year water surface elevation. The top of the existing basin embankment is at an elevation of 1432 feet. The peak 100-year inflow into the basin is 1,106 cfs from the previous studies. Based on this flow rate, the basin and spillway need to be designed to pass a flow rate of 1,493 cfs in

combination with the discharge through the spillway and outlet system. Based on the results in the Q3 memorandum (2018) the peak flow through the outlet system is 247 cfs. Therefore, the spillway shall be designed to pass a flow rate of 1,246 cfs.

The existing condition in the basin includes the use of a box weir spillway and primary outlet pipe system to pass the 1,000-year storm event. The box weir and outlet pipe are located along the west bank of the existing detention basin. The previous study by Madole (2017) used a combination of spillways (2) and a box weir system for the emergency spillway.

For this study, twwo potential alternatives were evaluated for the spillway configuration. This first system includes a box weir facility within the basin that discharges to an oversized outlet pipe designed to carry the spillway discharge. The second alternative includes an above ground spillway that discharges to the existing residential street sections south of the existing basin. Both alternatives will be sized to convey the 1,000-year combined discharge of 1,493 cfs.

***Box Weir System.*** This system includes a box weir system that is located above the 100-year water surface in the basin. The box weir is designed to discharge the peak flow over the weir crest elevation then out to the discharge location in an underground pipe or box culvert facility. This configuration is used in the existing basin configuration.

The depth of flow over the weir crest shall be at least 1-foot below the crest of the basin embankment. The box weir is designed as a sharped crested weir and the weir length is established to maintain a depth of flow below the top of the embankment. The depth of flow over the weir is calculated using the basic weir equation:

$$Q = CLH^{3/2}$$

Where:

C = wier coefficient (3.3 for sharp crested weir)
L = length of weir (feet)
H = depth of flow over weir crest (feet)

Using the geometry from the July memorandum, the crest of the emergency spillway is at 1426.6 feet. Using a top of embankment of 1432 feet, the maximum depth of flow over the weir crest is 4.4 feet with 1-foot of freeboard. Therefore, the weir crest length needs to be approximately 41 feet. This is similar to the existing condition in the basin.

A WSPG hydraulic analysis of the outlet pipe was prepared to determine the required storm drain size to convey the emergency flow discharge. The results of the analysis indicate that the outlet pipe needs to be upsized to a 144-inch diameter pipe to accommodate the full 1,000-year discharge. The proposed configuration of the box weir system is illustrated in Figure 2.

The primary advantange of a box weir system is that it avoids retrofiting of the existing basin to include a new open channel spillway, and mimicks the existing basin which uses a box weir system. Overflow paths

for a 1,000-year event would maintain the current flow paths. The disadvantage of the system is the potential for clogging during a major event. However, since the majority of the flow tributary to the basin is via an underground storm drain system, the potential for clogging is reduced.

***Open Channel Spillway*.** The second alternative includes the use of an open channel spillway. A trapezoidal channel section is proposed with the crest of the open channel spillway set at the same elevation as the box weir alternative at elevation 1426.6 feet with a maximum flow depth of 4.4 feet. Critical depth calculations at the crest of the spillway were used to determine an approximate width of the spillway to pass the design flow with a depth of less than 4.4 feet. The results of the critical depth calculations indicate a trapezoidal spillway with a base width of 16 feet and side slopes of 3:1 produces a flow depth of 4.3 feet. The top width of the spillway at the elevation of the top of the basin embankment is 48.4 feet. With the open channel spillway, the outlet pipe from the basin only needs to be sized for the 100-year peak discharge of 247 cfs. This results in an outlet pipe size of approximately 60-inches.

The location for the spillway was evaluated based on the existing conditions and restrictions associated with the proposed development. The existing basin does not have an open channel spillway system and uses a box weir type facility. Therefore a new location for the spillway needed to be identified. Limited opportunities exist on the downstream (south) side of the existing basin. Grove Avenue dead ends at the basin embankment and provides an opportunity to retrofit the basin for an open channel spillway at this location. The street section has a curb-to-curb width of appoximately 40-feet and can accommodate the required spillway size. The spillway section would consist of a trapezoidal channel. The spillway could be constructed using a concrete lining or an articulated concrete block (ACB) system. The ACB system has open cells and gaps between the blocks that can be vegetated with low native grasses or other acceptable materails to reduce the visibility of the system.

The proposed open channel spillway location and a Google® street view rendering of the potential configuration are shown on Figures 3, 4, and 5.

The main advantage of the open channel spillway is the ability to easily inspect and maintain the system and the limited potential for clogging and failure of the basin embankment. The disadvantage is that the system would discharge directly to a residential street (Grove Avenue) that was not designed for an emergency discharge. It is important to note that the discharge would only occur during an extreme event which would exceed a 100-year storm. The additional freeboard between the 100-year water surface elevation in the basin and the spillway crest elevation would further reduce the possibility of a discharge over the spillway.

**Conclusions**

The bypass system was determined to provide no benefit to the performance or cost of the required storm drain system. Therefore, a bypass system is not recommended to be incorporated into the final design.

Two potential spillway systems were identified for the basin improvements, a box weir system similar to the existing condition, and an open channel spillway. Both systems have their advantages and disadvantages.

A combined system could also be incorporated into the final basin design. A combined system could capture the benefits of both system types and minimize the potential impacts of the project development. For example, the combined system could be designed to pass a 200- or 500-year storm through the box weir system and provide an open channel spillway for the larger events up to the 1,000-year storm event. This would limit the potential for an emergency discharge to Grove Avenue and reduce the risk to the basin embankment if the box weir system were to clog or fail. In addition, the weir structure and outlet discharge pipe could be reduced in size compared to the Box Weir System alternative.

Figure 2 – Box Weir Outlet Configuration

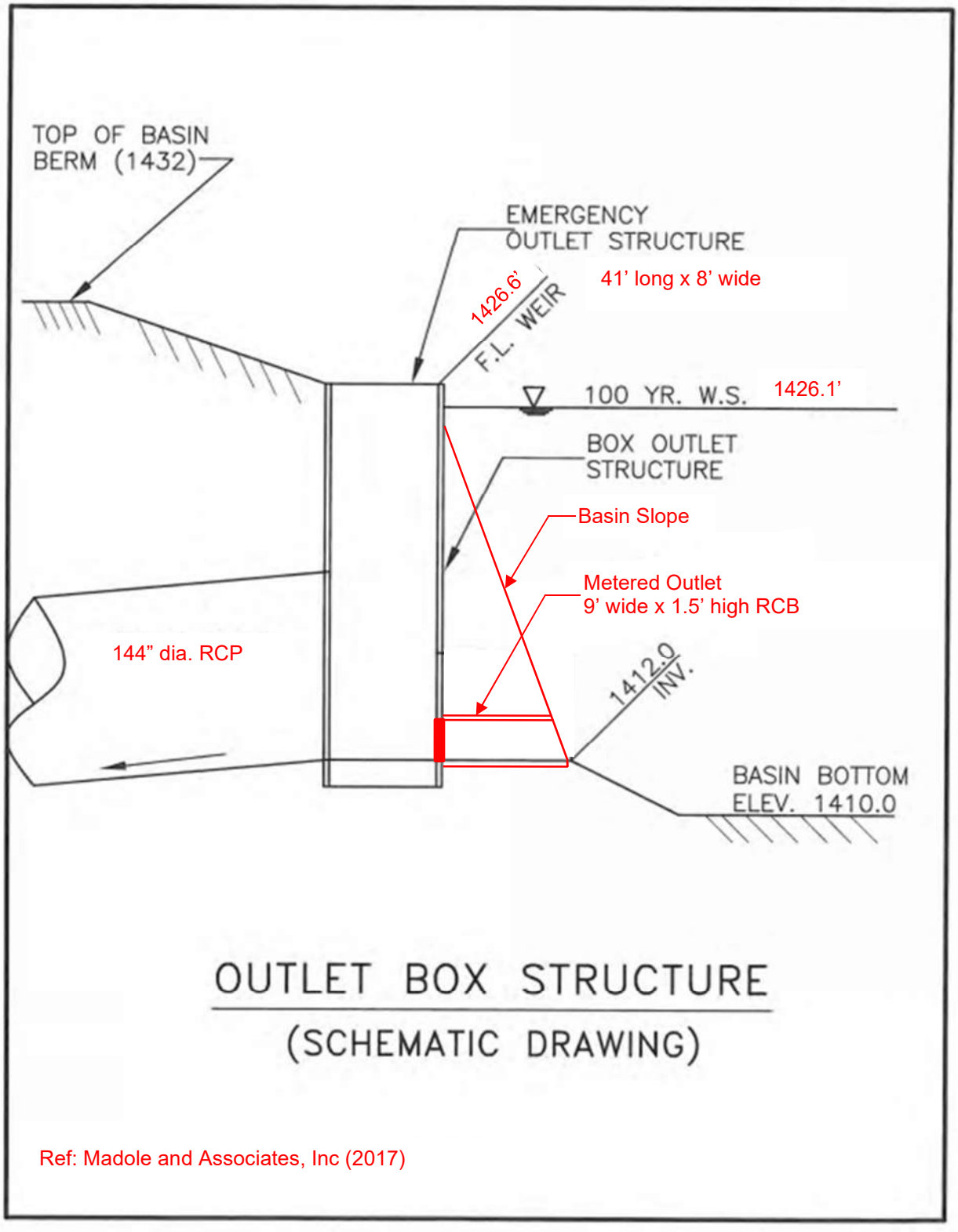


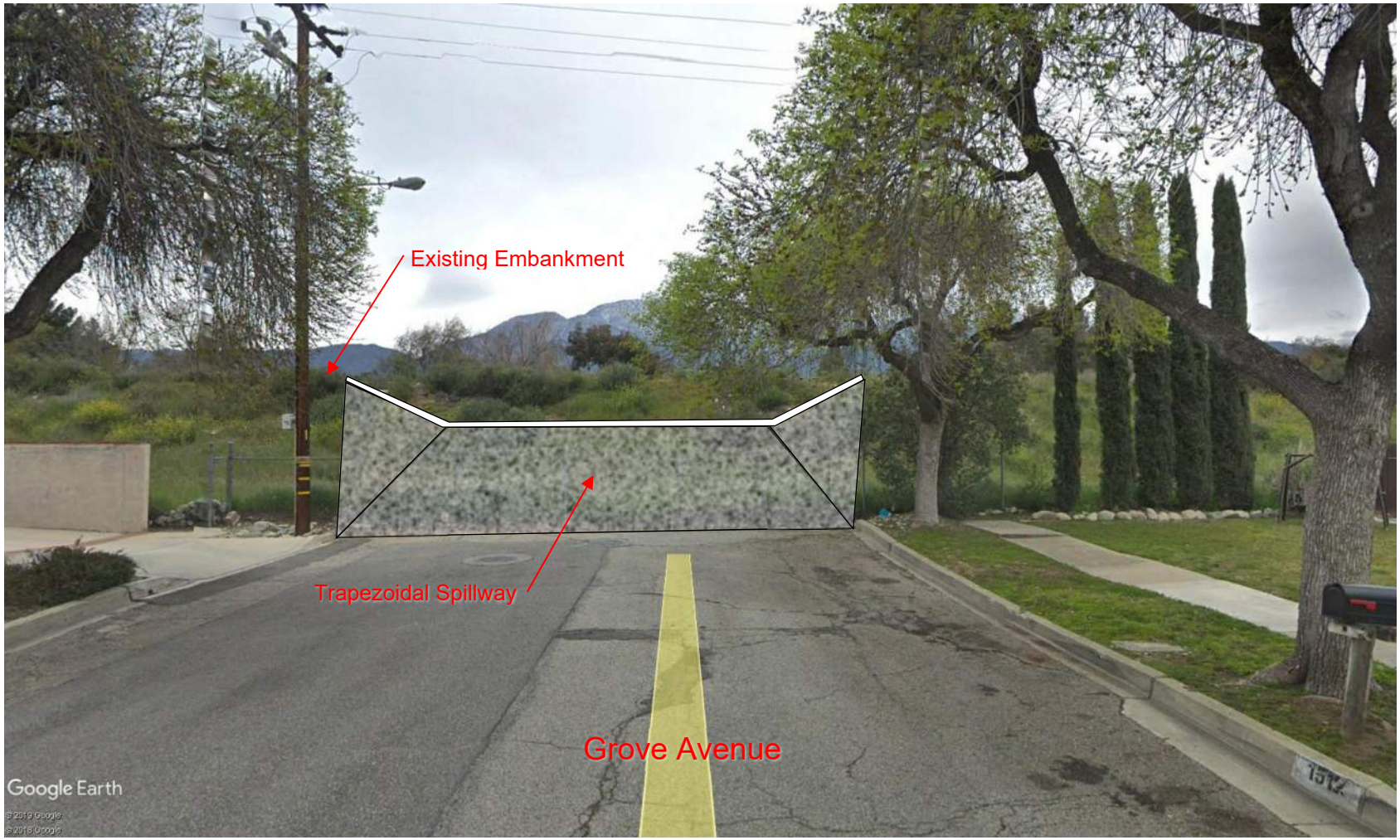
Figure 3 – Open Channel Spillway Vicinity Map



Figure 4 – Open Channel Spillway Location Map



Figure 5 – Open Channel Spillway Rendering (looking north)



**References**

Madole and Associates, Inc., 2017. *Drainage Study in the City of Upland for the 15th Street Basin.* Prepared for Colonies Partner, June 12.

Q3 Consulting, 2018. *Technical Memorandum, 15th Street Basin Modifications Review and Recommendations.* Prepared for Frontier Communities, July 31.

N:\10.031.000\REPORTS\15 St Basin Modifications_Spillway Memo.docx

# APPENDIX G5:

# SLOPE STABILITY EVALUATION – NEW BASIN

GeoTek, Inc.
1548 North Maple Street, Corona, California 92880
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

September 16, 2019
Project No. 1925-CR

**Frontier Enterprises**
2151 East Convention Center Way, Suite 114
Ontario, California 91764

Attention: Mr. Timothy Nguyen

Subject: Slope Stability Evaluation-New Basin
Proposed Single-Family Residential Development
Tentative Tract 20245
Upland, San Bernardino County, California

References: See Page 3

Dear Mr. Nguyen:

As requested, GeoTek, Inc. (GeoTek) has completed a stability evaluation for the new basin planned for the site. As noted on Tentative Tract Map 20245, prepared by Proactive Engineering Consultants, a stormwater infiltration basin is mapped to the east of the planned residential units at this site. The basin will consist of side slopes of 3:1 (horizontal:vertical) to a maximum height of about 20 feet.

One representative sample of the soil within the basin was collected and returned to the GeoTek laboratory to determine the shear strength of the site soils. A direct shear test was performed on this sample per ASTM D-3080 and the results of that tests are attached.

The stability of the planned 20-foot high 3:1 basin slope was determined using the computer software program Slide 7.0 developed by Rocscience. The stability analysis incorporated both static and pseudostatic conditions. The results of the analysis indicated a factor of safety of 3.0 for the static condition and 2.0 for the pseudostatic state. Since the calculated factor of safeties exceed the generally accepted minimum safety factors of 1.5 for the static condition and 1.1 for pseudostatic, it is our opinion that the planned side slopes will be grossly stable and geotechnically suitable.

Should you have any questions after reviewing this letter, please feel free to contact our office at your convenience.

Respectfully submitted,
**GeoTek, Inc.**

Anna M. Scott
Project Geologist

Robert R. Russell
GE 2042, Exp. 12/31/20
Senior Project Engineer

Edward H. LaMont
CEG 1892, Exp. 7/31/20
Principal Geologist

Attachments: Laboratory Test Results
Slope Stability Analysis

Distribution: (1) Addressee via email

*C:\Users\ascott\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\HK64D5MP\1925CR Basin Slope Stability Evaluation.docx*

## REFERENCES

GeoTek, Inc., In-house proprietary information.

_____, 2018, "Geotechnical and Infiltration Evaluation, Proposed Single-Family Residential Development, Assessor's Parcel Numbers (APNs) 1045-121-02 and 1045-151-34, Upland Colonies 59, Upland, San Bernardino County, California," Project No. 1925-CR, dated July 12.

Proactive Engineering Consultants, 2019, "Tentative Tract Map 20245, City of Upland," dated June 13.

GEOTEK

# MOISTURE/DENSITY RELATIONSHIP

**Client:** Frontier Enterprises
**Project:** Tract No. 20245
**Location:** Upland
**Material Type:** Gray Brown Gravelly Silty F-M Sand
**Material Supplier:** -
**Material Source:** -
**Sample Location:** Bulk #1

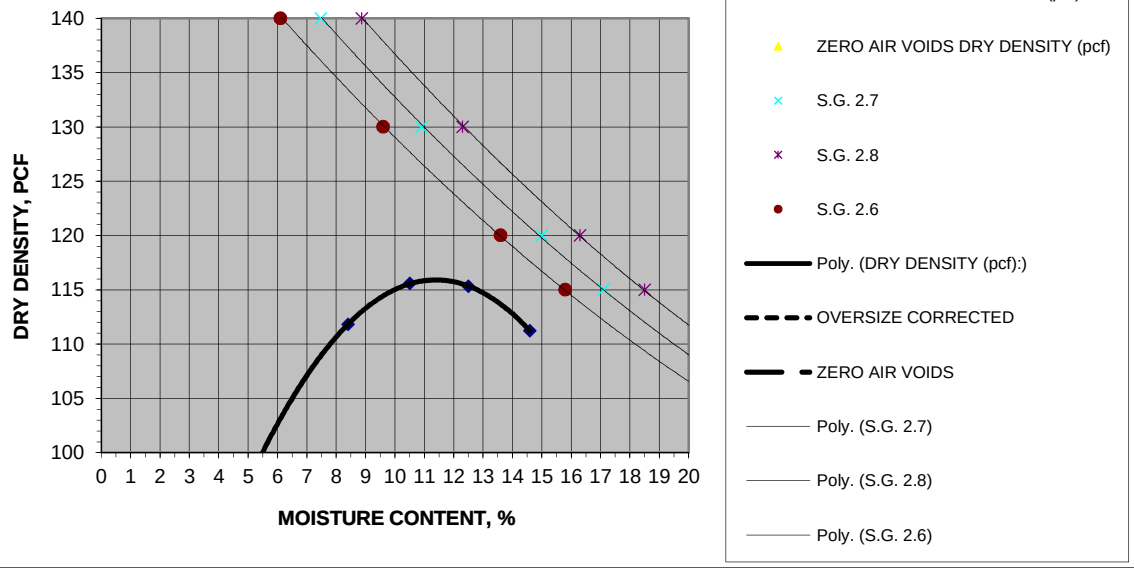
**Job No.:** 1925-CR
**Lab No.:** Corona

**Sampled By:** DA
**Received By:** DLI
**Tested By:** DLI
**Reviewed By:** RR

**Date Sampled:** 5-Sep-19
**Date Received:** 5-Sep-19
**Date Tested:** 12-Sep-19
**Date Reviewed:** 16-Jun-19

**Test Procedure:** ASTM 1557 **Method:** C
**Oversized Material (%):** 13.7 **Correction Required:** ☐ yes ☐ no

**MOISTURE/DENSITY RELATIONSHIP CURVE**




## MOISTURE DENSITY RELATIONSHIP VALUES

| | | | |
|---|---|---|---|
| **Maximum Dry Density, pcf** | 116.0 | **@ Optimum Moisture, %** | 11.5 |
| **Corrected Maximum Dry Density, pcf** | | **@ Optimum Moisture, %** | |

## MATERIAL DESCRIPTION

**Grain Size Distribution:**

| | |
|---|---|
| | % Gravel (retained on No. 4) |
| | % Sand (Passing No. 4, Retained on No. 200) |
| | % Silt and Clay (Passing No. 200) |

**Atterberg Limits:**

| | |
|---|---|
| | Liquid Limit, % |
| | Plastic Limit, % |
| | Plasticity Index, % |

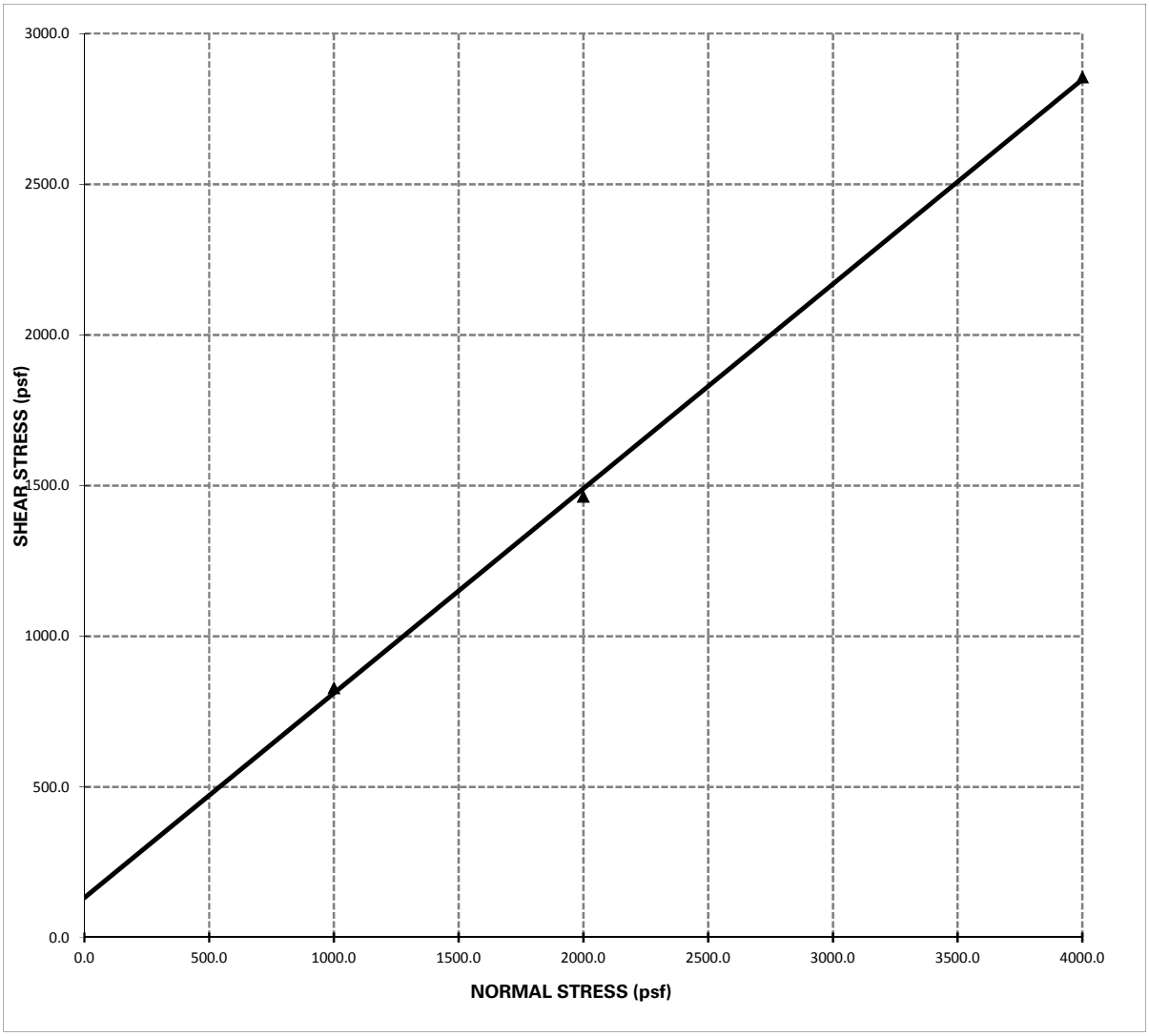
**Classification:**

Unified Soils Classification: _____

AASHTO Soils Classification: _____

# DIRECT SHEAR TEST

| | | | |
|---|---|---|---|
| ***Project Name:*** | Upland | ***Sample Location:*** | Bulk #1 |
| ***Project Number:*** | 1925-CR | ***Date Tested:*** | 9/12/2019 |

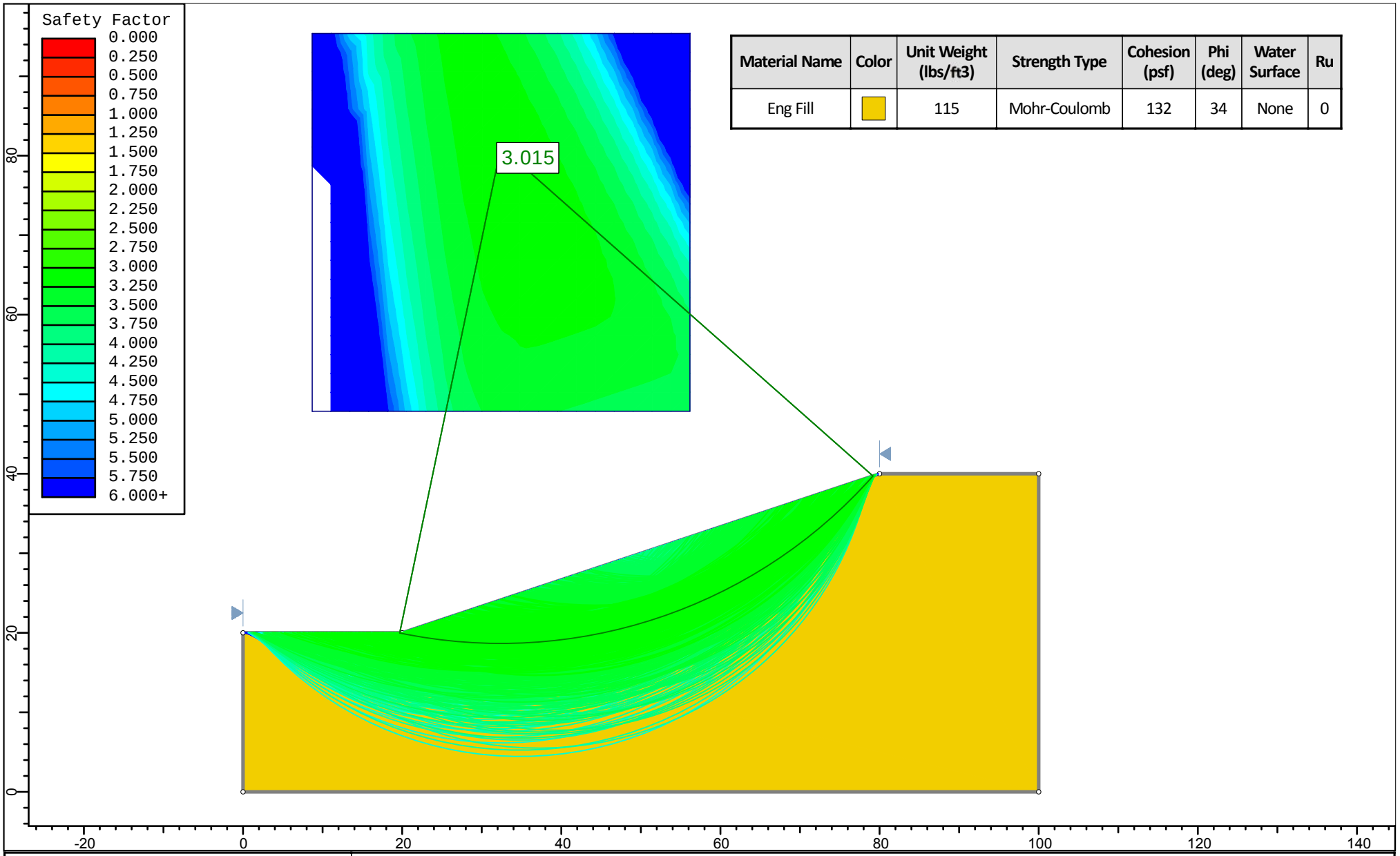



**Shear Strength:** $\Phi$ = **34.2** $^{o}$ , **C = 132.00 psf**

**Notes:** 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.035 in/min.

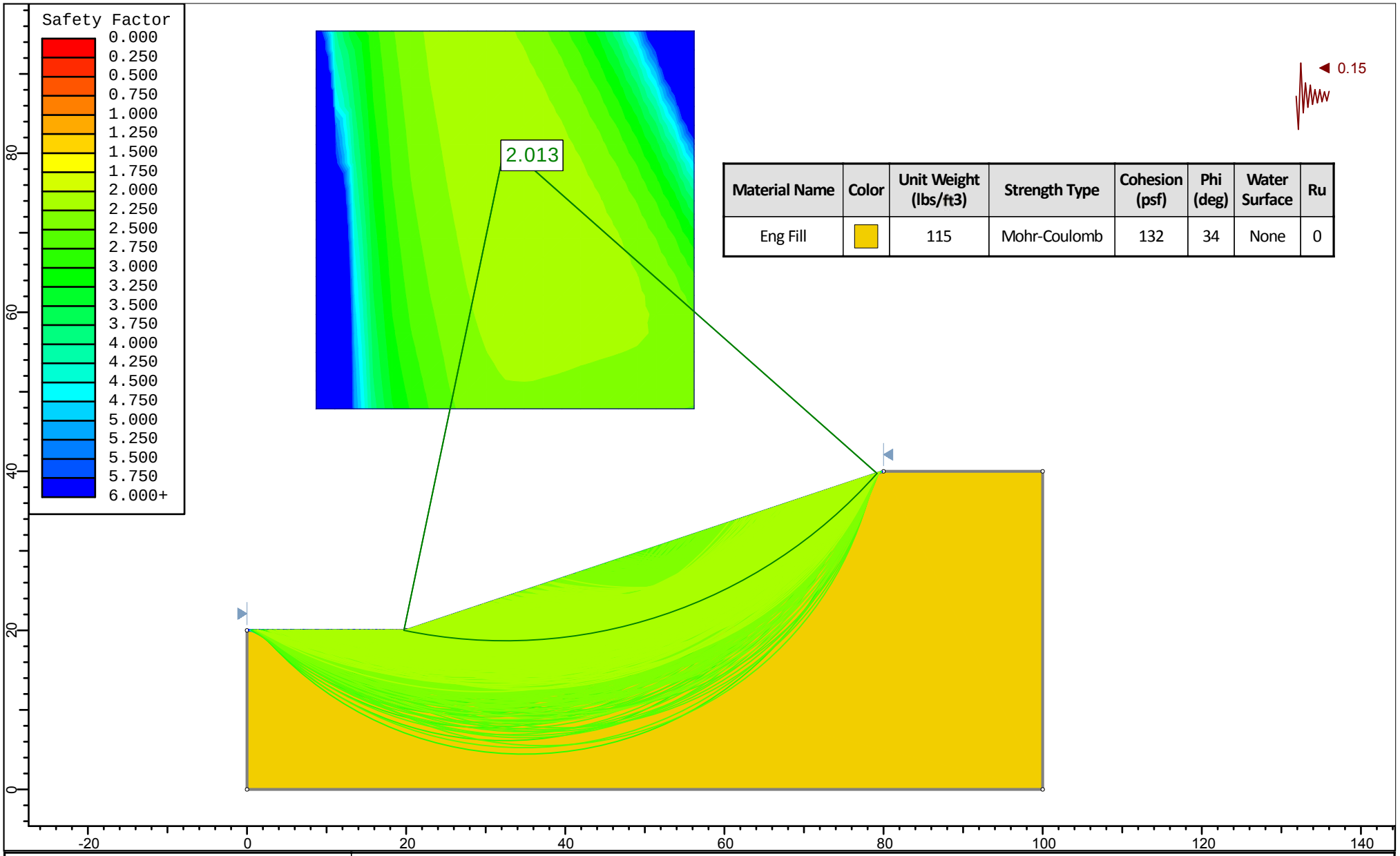



| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface | Ru |
|---|---|---|---|---|---|---|---|
| Eng Fill | | 115 | Mohr-Coulomb | 132 | 34 | None | 0 |

rocscience

SLIDEINTERPRET 7.038

| | | | |
|---|---|---|---|
| Project | Tentative Tract No. 20245, Upland | | |
| Analysis Description | Basin 3:1 Static | | |
| Drawn By | NCT | Scale 1:200 | Company GeoTek, Inc. |
| Date | 9/16/2019, 9:29:25 AM | | File Name 1925CR Slope Stability for 2to1 Basin.slmd |




| | | | |
|---|---|---|---|
| rocscience | Project | Tentative Tract No. 20245, Upland | |
| | Analysis Description | Basin 3:1 Pseudostatic | |
| | Drawn By: NCT | Scale: 1:200 | Company: GeoTek, Inc. |
| | Date: 9/16/2019, 9:44:42 AM | | File Name: 1925CR Slope Stability for 2to1 Basin.slmd |

SLIDEINTERPRET 7.038

**References**

Madole and Associates, Inc., 2017. *Drainage Study in the City of Upland for the 15th Street Basin.* Prepared for Colonies Partner, June 12.

Q3 Consulting, 2018. *Technical Memorandum, 15th Street Basin Modifications Review and Recommendations.* Prepared for Frontier Communities, July 31.

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# APPENDIX H:

# NOISE IMPACT ANALYSIS

# Upland Colonies

## NOISE IMPACT ANALYSIS

### CITY OF UPLAND

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Alex Wolfe, INCE
awolfe@urbanxroads.com
(949) 336-5977

JULY 20, 2018

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ANSI | American National Standards Institute |
| Calveno | California Vehicle Noise |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| dBA | A-weighted decibels |
| EPA | Environmental Protection Agency |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| IEC | International Electrotechnical Commission |
| INCE | Institute of Noise Control Engineering |
| $L_{eq}$ | Equivalent continuous (average) sound level |
| $L_{max}$ | Maximum level measured over the time interval |
| $L_{min}$ | Minimum level measured over the time interval |
| mph | Miles per hour |
| PPV | Peak Particle Velocity |
| Project | Upland Colonies |
| REMEL | Reference Energy Mean Emission Level |
| RMS | Root-mean-square |
| VdB | Vibration Decibels |

# EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Upland Colonies development ("Project"). The Project site is located on the north side of 15th Street in the City of Upland. The Project is to include the development of 85 single family detached residential dwelling units. This noise study has been prepared to satisfy applicable City of Upland noise standards.

## ON-SITE TRAFFIC NOISE ANALYSIS

The results of this analysis indicate that future vehicle noise from 15th Street represents the principal source of community noise that will impact the Project site. The Project will also experience some background traffic noise impacts from the Project's internal local streets, however due to the distance, topography and low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment. With the following recommended noise mitigation measures shown on Exhibit ES-A, the on-site noise impacts will be *less than significant*.

### EXTERIOR NOISE ANALYSIS

To satisfy the City of Upland 60 dBA CNEL exterior noise level standard for residential land use, the construction of minimum 6-foot high noise barriers is required for outdoor living areas (backyards) of lots adjacent to 15th Street. With the recommended noise barriers shown on Exhibit ES-A, the future exterior noise levels will range from 57.0 to 59.5 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Upland 60 dBA CNEL exterior noise level standards for residential land use. The recommended noise barrier height represents the minimum wall and/or berm combination height required to satisfy the City of Upland exterior noise level standards.

The recommended noise control barriers shall be constructed so that the top of each wall and /or berm combination extends to the recommended height above the pad elevation of the lot it is shielding. When the road is elevated above the pad elevation, the barrier shall extend to the recommended height above the highest point between the residential home and the road. The barrier shall consist of a solid face from top to bottom. Unnecessary openings or decorative cutouts shall not be made. All gaps (except for weep holes) should be filled with grout or caulking. The barrier shall provide a weight of at least 4 pounds per square foot of face area with no decorative cutouts or line-of-sight openings between shielded areas and the roadways, or a minimum transmission loss of 20 dBA. (1) The noise barrier shall be constructed using the following materials:

- Masonry block;
- Stucco veneer over wood framing (or foam core), or 1-inch-thick tongue and groove wood of sufficient weight per square foot;
- Glass (1/4-inch-thick), or other transparent material with sufficient weight per square foot capable of providing a minimum transmission loss of 20 dBA;

- Earthen berm;
- Any combination of these construction materials.

**INTERIOR NOISE ANALYSIS**

This noise study evaluates the interior noise levels at the Project's residential homes based on the City of Upland 45 dBA CNEL residential interior noise level standard. The Project buildings are shown to require a Noise Reduction (NR) of up to 19.9 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g. air conditioning). To meet the City of Upland 45 dBA CNEL interior noise standards the following on-site standard construction measures are required:

- Windows/Glass Doors: All units require windows and sliding glass doors that have well-fitted, well-weather-stripped assemblies, and minimum sound transmission class (STC) ratings of 27.
- Exterior Doors (Non-Glass): All exterior doors shall be well weather-stripped and have well-sealed perimeter gaps to achieve minimum sound transmission class (STC) ratings of 27. (2)
- Exterior Walls: At any penetrations of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar to form an airtight seal.
- Roof: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Ceilings shall be per manufacturer's specification or well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided which satisfies the requirements of the Uniform Building Code.

Based on the results of this analysis, the Project will satisfy the 45 dBA CNEL interior noise level standard with standard building construction. Exhibit ES-A shows the on-site recommendations.

## CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the closest point to the nearby receiver locations from primary Project construction activity. Using sample reference noise levels to represent the planned construction activities of the Upland Colonies site, this analysis estimates the Project-related construction noise levels at nearby receiver locations. Based on the analysis, the Project-related short-term construction noise levels are shown to exceed the City of Upland Municipal Code 75 dBA $L_{max}$ noise level threshold at noise-sensitive receiver locations R2 and R5. Therefore, the unmitigated Project-related construction noise level levels are considered a *potentially significant* temporary noise impact.

Temporary construction noise mitigation measures are therefore required to reduce the impacts at receiver locations R2 and R5. This includes mitigation in the form of engine compartment sound dampening mats or blankets for large mobile equipment (greater than 80,000 pounds),

and a 50-foot buffer for large mobile equipment (greater than 80,000 pounds) and loaded trucks, as shown on Exhibit ES-B. The construction noise mitigation measures are outlined below. With the mitigation measures identified herein, the noise impact due to Project construction is considered a *less than significant* impact with mitigation at all receiver locations.

## CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from temporary Project construction activities would cause only intermittent, localized intrusion. The analysis shows that the unmitigated Project-construction vibration levels will exceed the Federal Transit Administration (FTA) 80 VdB threshold at receiver locations R5 adjacent to the Project site, and are therefore, considered a *potentially significant* impact. Therefore, the use of large mobile equipment (greater than 80,000 pounds) and loaded trucks within 50 feet of nearby land uses shall be prohibited unless the vibration levels are shown to be less than the 80 VdB FTA threshold. With the recommended mitigation measures in this study, the Project-related vibration impacts at the nearby receiver locations represents a *less than significant* impact during the worst-case construction activities at the Project site.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter.

### CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

The following mitigation measures are required to reduce construction noise and vibration levels produced by the construction equipment to the nearby sensitive residential land uses.

- Large loaded trucks and mobile equipment (greater than or equal to 80,000 pounds) (3) shall not be used within 50 feet of receiver location R5 if occupied at the time of Project construction, as shown on Exhibit ES-B. Instead, smaller, rubber-tired mobile equipment (less than 80,000 pounds) or equivalent alternative equipment shall be used within this area during Project construction to reduce vibration effects.
- Install sound dampening mats or blankets to the engine compartments of large mobile equipment (greater than or equal to 80,000 pounds) which are capable of a minimum 5 dBA noise reduction (FHWA, Construction Noise Special Report). (4) The dampening materials must be capable of the minimum 5 dBA noise reduction and can be made of commercially-available sound dampening materials, including but not limited to polyurethane foam and vinyl sheeting (University of Massachusetts Lowell The Use of Noise Dampening Mats to Reduce Heavy-Equipment Noise). (5)
- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that Project construction activities shall comply with the City of Upland Municipal Code requirements. (6)
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction

equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.

- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the northern center).
- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

## SUMMARY OF SIGNIFICANCE FINDINGS

The results of this Upland Colonies Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact before and after incorporation of Project design features.

**TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS**

| Analysis | Report Section | Significance Findings | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| On-Site Traffic Noise | 5 | *Potentially Significant* | *Less Than Significant* |
| Construction Noise | 7 | *Potentially Significant* | *Less Than Significant* |
| Construction Vibration | | *Potentially Significant* | *Less Than Significant* |

"n/a" = No mitigation is required.

## EXHIBIT ES-A: ON-SITE MITIGATION SUMMARY



## EXHIBIT ES-B: CONSTRUCTION MITIGATION SUMMARY



# 1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Upland Colonies ("Project"). This noise study describes the proposed Project, provides information regarding noise fundamentals, outlines the local regulatory setting, provides the study methods and procedures for traffic and construction noise analysis, and evaluates the future exterior noise environment.

## 1.1 SITE LOCATION

The proposed Upland Colonies Project is located on the north side of 15th Street in the City of Upland, as shown on Exhibit 1-A. The Project site is currently vacant. Land uses surrounding the Project site include a golf course to the north, and residential homes to the south, west, and east. The Interstate 210 (I-210) freeway right-of-way is located roughly 1 mile north of the Project site. Cable Airport is located approximately 2.6 miles southwest of the Project site, and the Los Angeles/Ontario International Airport is located roughly 4.2 miles south of the Project site.

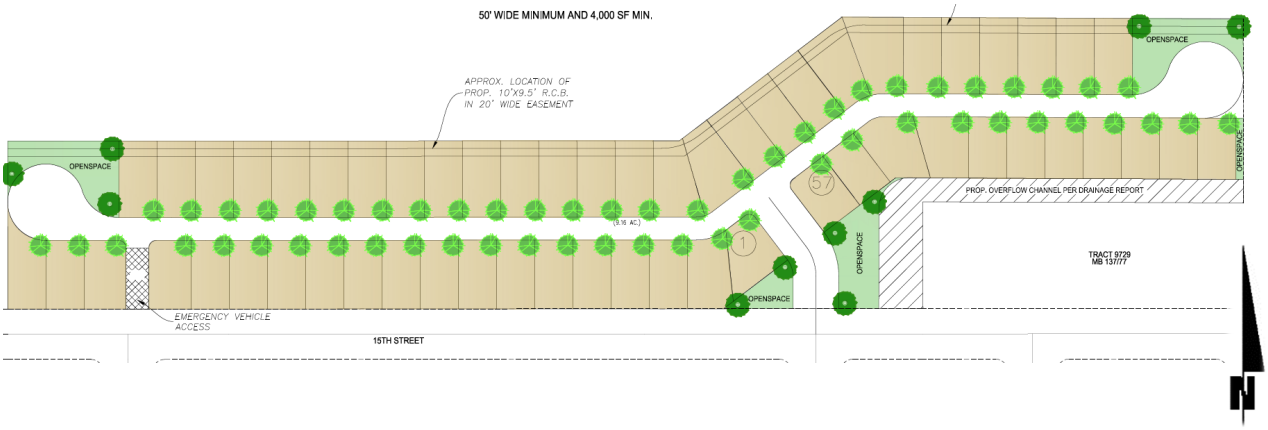
## 1.2 PROJECT DESCRIPTION

The Project is to include the development of 85 single family detached residential dwelling units, as shown on Exhibit 1-B.

## EXHIBIT 1-A: LOCATION MAP



## EXHIBIT 1-B: SITE PLAN



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# 2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

**EXHIBIT 2-A: TYPICAL NOISE LEVELS**

| COMMON OUTDOOR ACTIVITIES | COMMON INDOOR ACTIVITIES | A - WEIGHTED SOUND LEVEL dBA | SUBJECTIVE LOUDNESS | EFFECTS OF NOISE |
|---|---|---|---|---|
| THRESHOLD OF PAIN | | 140 | INTOLERABLE OR DEAFENING | HEARING LOSS |
| NEAR JET ENGINE | | 130 | | |
| | | 120 | | |
| JET FLY-OVER AT 300m (1000 ft) | ROCK BAND | 110 | | |
| LOUD AUTO HORN | | 100 | VERY NOISY | |
| GAS LAWN MOWER AT 1m (3 ft) | | 90 | | |
| DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph) | FOOD BLENDER AT 1m (3 ft) | 80 | | SPEECH INTERFERENCE |
| NOISY URBAN AREA, DAYTIME | VACUUM CLEANER AT 3m (10 ft) | 70 | LOUD | |
| HEAVY TRAFFIC AT 90m (300 ft) | NORMAL SPEECH AT 1m (3 ft) | 60 | | |
| QUIET URBAN DAYTIME | LARGE BUSINESS OFFICE | 50 | MODERATE | SLEEP DISTURBANCE |
| QUIET URBAN NIGHTTIME | THEATER, LARGE CONFERENCE ROOM (BACKGROUND) | 40 | | |
| QUIET SUBURBAN NIGHTTIME | LIBRARY | 30 | FAINT | NO EFFECT |
| QUIET RURAL NIGHTTIME | BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND) | 20 | | |
| | BROADCAST/RECORDING STUDIO | 10 | VERY FAINT | |
| LOWEST THRESHOLD OF HUMAN HEARING | LOWEST THRESHOLD OF HUMAN HEARING | 0 | | |

*Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.*

## 2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (7) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (8) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

## 2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level ($L_{eq}$). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors $L_{50}$, $L_{25}$, $L_8$ and $L_2$, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent, and 2 percent of a stated time. Sound levels associated with the $L_2$ and $L_8$ typically describe transient or short-term events, while levels associated with the $L_{50}$ describe the steady state (or median) noise conditions. While the $L_{50}$ describes the median noise levels occurring 50 percent of the time, the $L_{eq}$ accounts for the total energy (average) observed for the entire hour. Therefore, the $L_{eq}$ noise descriptor is generally 1-2 dBA higher than the $L_{50}$ noise level.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA $L_{eq}$ sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA $L_{eq}$ sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Upland relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

## 2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

### 2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (7)

### 2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (9)

### 2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (7)

### 2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (9)

## 2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

## 2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (9)

## 2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (10)

## 2.7 VIBRATION

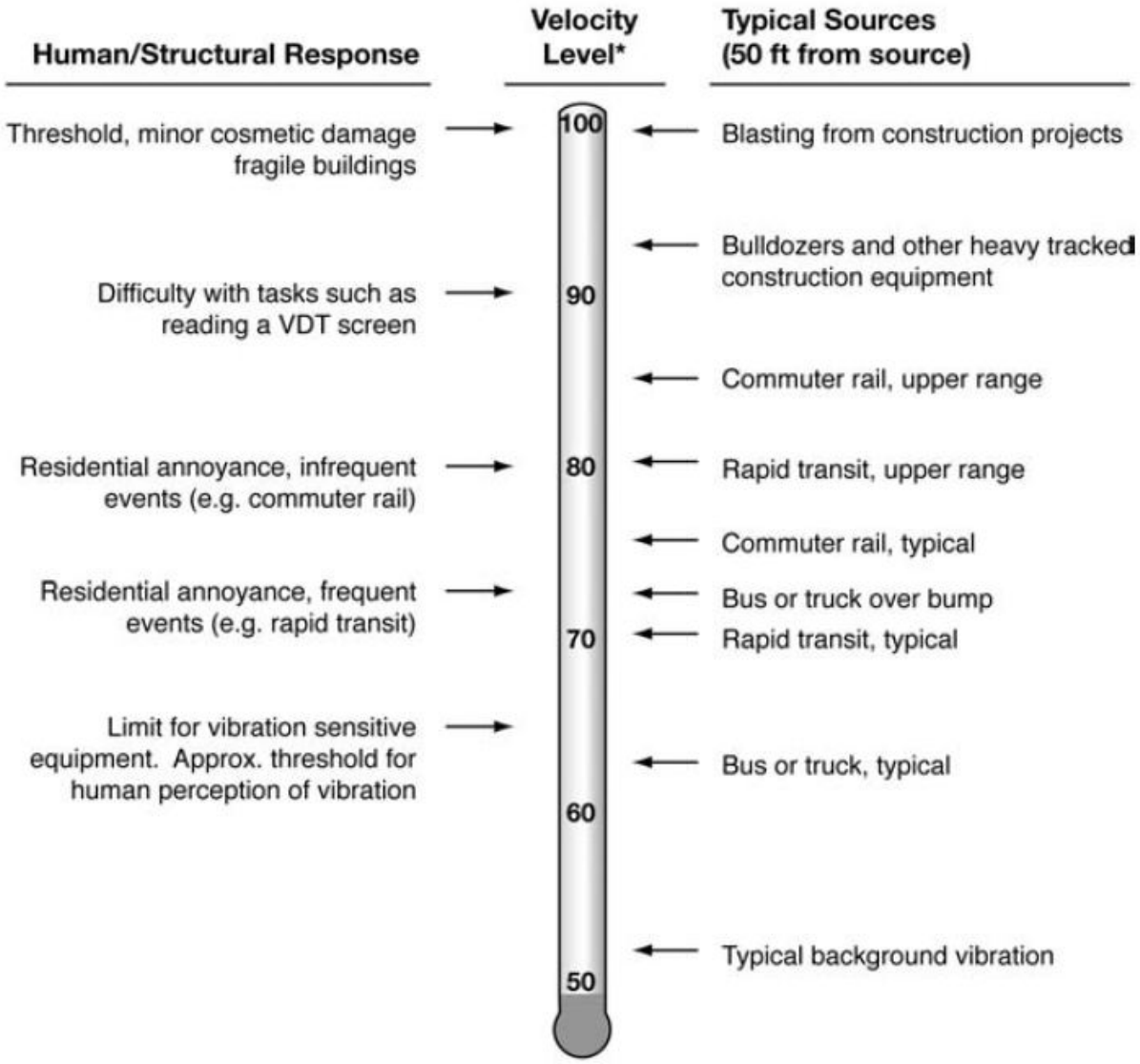
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (11), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration

on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-B illustrates common vibration sources and the human and structural response to ground-borne vibration.

**EXHIBIT 2-B: TYPICAL LEVELS OF GROUND-BORNE VIBRATION**




* *RMS Vibration Velocity Level in VdB relative to $10^{-6}$ inches/second*

*Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment*.

# 3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

## 3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

## 3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

## 3.3 CITY OF UPLAND GENERAL PLAN SAFETY ELEMENT

The City of Upland has adopted a Noise section in its Safety Element of the General Plan to protect its residents, labor force, and visitors from the harmful effects of noise by establishing exterior and interior noise standards. (13) The noise-related policies in the Safety Element help mitigate potential noise impacts by requiring the implementation of noise reduction techniques in site design and construction to ensure the compatibility of land uses. Mobile sources of noise, such as vehicles and aircraft, are also regulated by the enforcement of Upland's noise standards. To

protect City of Upland residents from excessive noise, the Noise Element contains the following policies:

*Policy SAF-1.1 Exterior Noise Standards. Require noise mitigation for all development where the projected exterior noise levels exceed those shown in Table SAF-1, to the extent feasible.*

*Policy SAF-1.2 Exterior Incremental Noise Standards. Require noise mitigation for all development that increases existing noise levels by more than the allowable increment shown in Table SAF-4, to the extent feasible.*

*Policy SAF-1.3 Interior Noise Standards. Require new development to include noise mitigation to assure acceptable interior noise levels appropriate to the land use type: 45 dBA Ldn for residential, transient lodgings, hospitals, nursing homes, and other uses where people normally sleep; and 45 dBA Ldn (peak hour) for office buildings and similar uses.*

*Policy SAF-1.4 Location of Noise-Sensitive Land Uses. Prevent noise-sensitive land uses (schools, medical centers and hospitals, senior centers, and residences) from locating in areas with noise levels that exceed those considered normally acceptable for each land use unless measures can be implemented to reduce noise to acceptable levels.*

*Policy SAF-1.5 Noise Impact Study. Require a noise impact study to evaluate impacts of projects that may exceed 65 Ldn as part of the design review process.*

*Policy SAF-1.6 Acoustical Study. Require an acoustical study for all new residential developments that lie within the 65 Ldn noise contour on the Future Noise Contour Map, to ensure indoor levels will not exceed City standards. In addition, the City shall continue to enforce the California Building Code for indoor noise levels.*

*Policy SAF-1.7 Noise Reduction in Site Design. Require measures that attenuate exterior and/or interior noise levels to acceptable levels to be incorporated into all development projects where current and/or future outdoor noise levels may be unacceptable. Require noise reduction features, the focus of which shall be on site design techniques, so long as they do not conflict with the goals of the Community Character Element. Techniques include:*

- *a. Designing landscaped building setbacks to serve as a buffer between the noise source and receptor.*
- *b. Placing noise-tolerant land uses such as parking lots, maintenance facilities, and utility areas between the noise source and receptor.*
- *c. Orienting buildings to shield noise-sensitive outdoor spaces from a noise source.*
- *d. Locating bedrooms or balconies on the sides of buildings facing away from noise sources.*
- *e. Utilizing noise barriers, such as landscaped berms, to reduce adverse noise levels in noise-sensitive outdoor activity areas, avoiding sound walls wherever possible.*

*Policy SAF-1.8 Vibration Screening Distances. Require new residential and commercial projects located adjacent to major freeways, rail lines or other vibration sources to follow*

*the Federal Transit Administration screening distance criteria.*

*Policy SAF-1.9 Alternative to Sound Walls. Encourage the use of design strategies and other noise reduction methods along transportation corridors in lieu of sound walls to mitigate noise impacts and enhance aesthetics.*

*Policy SAF-1.10 Motor Vehicle Code. Enforce California Motor Vehicle Code that prohibits amplified sound that can be heard 50 feet or more from a vehicle, and that addresses excessive exhaust noise.*

*Policy SAF-1.11 Construction Noise. Require construction projects to adhere to the City's construction hours and incorporate measures to minimize impacts.*

*Policy SAF-1.12 Operational Noise. Require mixed-use, commercial, and industrial projects to mitigate operational noise impacts to adjoining sensitive uses to meet operational noise thresholds.*

This noise study has been prepared consistent with the policies of the General Plan Safety Element for noise. Policies SAF-1.1 and SAF-1.3 identify the exterior and interior noise level standards for the Project.

### 3.3.1 TRANSPORTATION NOISE STANDARDS

The City of Upland General Plan Safety Element, Policy SAF-1.1 identifies the transportation-related exterior noise compatibility standards for different land uses in Table SAF-1, as shown on Exhibit 3-A. For single-family residential land use such as the Project, the *normally acceptable* exterior noise level standard is 60 dBA CNEL. Further, Policy SAF-1.3, *Interior Noise Standards*, identifies an interior noise level standard of 45 dBA CNEL for new residential developments. (13)

**EXHIBIT 3-A: EXTERIOR NOISE COMPATIBILITY STANDARDS**

| Land Use Type | Highest Level of Noise Exposure that is Regarded as "Normally Acceptable" (Ldn of CNEL) |
|---|---|
| Residential – Low Density Single-Family, Duplex, Mobile Homes | 60 dBA |
| Residential – Multi-Family | 65 dBA |
| Mixed-Use | 70 dBA |
| Transient Lodging – Hotels, Motels | 65 dBA |
| Schools, Libraries, Churches, Hospitals, Nursing Homes | 70 dBA |
| Auditoriums, Concert Halls, Amphitheaters | Mitigation based on site-specific study |
| Sports Arena, Outdoors Spectator Sports | Mitigation based on site-specific study |
| Playgrounds, Neighborhood Parks | 70 dBA |
| Golf Courses, Riding Stables, Water Recreation, Cemeteries | 75 dBA |
| Office Buildings – Commercial, Office/Professional | 70 dBA |
| Industrial, Manufacturing, Utilities, Agriculture | 75 dBA |

Source: Governor's Office of Planning and Research, State of California General Plan Guidelines 2003, 2003, pages 244-254.

*Source: City of Upland General Plan Safety Element, Noise Section, Table SAF-1.*

## 3.4 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Upland Colonies Project, noise from construction activities are typically limited to the hours of operation established under the Municipal Code. The Municipal Code noise standards for construction are described below for the City of Upland to determine the potential noise impacts at the nearby sensitive receiver locations.

Construction activities are limited to the daytime hours of 7:00 a.m. to 6:00 p.m. on weekdays, per Section 9.40.100(K) of the City of Upland Municipal Code. Section 9.40.040 of the City of Upland Municipal Code establishes the *base ambient noise level* for residential land uses, such as those adjacent to the Project site, of 55 dBA during the hours of 7:00 a.m. to 10:00 p.m. and identifies the maximum allowable noise levels at residential use based on the 55 dBA *base ambient noise level* standard plus 20 dBA, which equates to a 75 dBA $L_{max}$ noise level standard. For this noise study, the Project-related construction noise level impacts are evaluated based on the maximum allowable noise level for residential uses of 75 dBA $L_{max}$ as outlined in the Municipal Code. (6) Appendix 3.1 includes the City of Upland Municipal Code noise standards.

## 3.5 CONSTRUCTION VIBRATION STANDARDS

The City of Upland has not identified or adopted specific vibration level standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. (11) Operational and construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generate little or no ground vibration. Large bulldozers and loaded trucks can cause perceptible vibration levels proximate sensitive receiver locations. The FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Project-related vibration impacts due to on-site operational and construction activities.

## 3.6 AIRPORT LAND USE COMPATIBILITY PLAN

Cable Airport is located approximately 2.6 miles southwest of the Project site, and the Los Angeles/Ontario International Airport is located roughly 4.2 miles south of the Project site. Further, the Project site is located outside of the 60 dBA CNEL noise level contour boundaries of both airports, and as such, does not require specific exterior or interior noise abatement measures to reduce potential aircraft-related noise levels.

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# 4 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future on-site noise environment, and potential Project-related construction noise and vibration impacts.

## 4.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (14) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (15) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

## 4.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the ADT volumes used for this analysis are presented on Table 4-1. Based on the City of Upland General Plan Circulation Element, Figure CIR-1, 15$^{th}$ Street is classified as a 2-lane Collector. (16) To predict the future on-site noise environment at the Project site, the ADT volumes identified in the *City of Upland General Plan Final Environmental Impact Report*, Table 5.4-4, were utilized for 15$^{th}$ Street. (17) The traffic volumes shown on Table 4-1 reflect future long-range traffic conditions needed to assess the future on-site traffic noise environment and to identify potential mitigation measures (if any) that address the worst-case future conditions. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (18)

**TABLE 4-1: ON-SITE ROADWAY PARAMETERS**

| Roadway | Lanes | Classification[1] | Roadway Capacity Volume[2] | Speed Limits (mph)[2] | Site Conditions[3] |
|---|---|---|---|---|---|
| 15th St. | 2 | Collector | 14,100 | 35 | Soft |

[1] Source: City of Upland General Plan Circulation Element, Figure CIR-I.
[2] Source: City of Upland General Plan Final Environmental Impact Report, Table 5.4-4.
[3] Posted speed limit.

Table 4-2 presents the time of day vehicle splits by vehicle type, and Table 4-3 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA Model based on roadway types.

**TABLE 4-2: TIME OF DAY VEHICLE SPLITS**

| Time Period | Vehicle Type | | |
|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks |
| Daytime (7:00 a.m. - 7:00 p.m.) | 77.5% | 84.8% | 86.5% |
| Evening (7:00 p.m. - 10:00 p.m.) | 12.9% | 4.9% | 2.7% |
| Nighttime (10:00 p.m. - 7:00 a.m.) | 9.6% | 10.3% | 10.8% |
| Total: | 100.0% | 100.0% | 100.0% |

Source: Typical Southern California vehicle mix.

**TABLE 4-3: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)**

| Roadway | Total % Traffic Flow | | | Total |
|---|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks | |
| All Roadways | 97.42% | 1.84% | 0.74% | 100.00% |

Source: Typical Southern California vehicle mix.

To predict the future noise environment at residential lots within the Project site, coordinate information was collected to identify the noise transmission path between the noise source and receiver. The coordinate information is based on the Project site plan showing the plotting of the residential building in relationship to 15$^{th}$ Street as previously shown on Exhibit 1-B.

The exterior noise level impacts at the outdoor living areas (backyards) and first-floor building facade were placed five feet above the pad elevation. All second-floor receivers were located 14 feet above the proposed finished floor elevation.

## 4.3 CONSTRUCTION ACTIVITY

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation
- Grading
- Paving
- Building Construction
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Upland Colonies Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (19)

## 4.4 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 4-4 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 4-4 have been adjusted to describe a common reference distance of 50 feet.

**TABLE 4-4: CONSTRUCTION REFERENCE NOISE LEVELS**

| ID | Noise Source | Reference Measurement Duration | Reference Distance To Source (Feet) | Reference Noise Levels @ Reference Distance (dBA $L_{max}$) | Reference Noise Levels @ 50 Feet (dBA $L_{max}$)[5] |
|---|---|---|---|---|---|
| 1 | Truck Pass-Bys & Dozer Activity[1] | 0:01:15 | 30' | 68.1 | 63.7 |
| 1 | Dozer Activity[1] | 0:01:00 | 30' | 76.4 | 72.0 |
| 2 | Construction Vehicle Maintenance Activities[2] | 0:01:00 | 30' | 74.8 | 70.4 |
| 3 | Foundation Trenching[2] | 0:01:01 | 30' | 74.9 | 70.5 |
| 4 | Rough Grading Activities[2] | 0:05:00 | 30' | 84.8 | 80.4 |
| 5 | Framing[3] | 0:02:00 | 30' | 76.7 | 72.3 |
| 6 | Concrete Mixer Truck Movements[4] | 0:01:00 | 50' | 73.1 | 73.1 |
| 7 | Concrete Paver Activities[4] | 0:01:00 | 30' | 75.7 | 71.3 |
| 8 | Concrete Mixer Pour & Paving Activities[4] | 0:01:00 | 30' | 76.3 | 71.9 |
| 9 | Concrete Mixer Backup Alarms & Air Brakes[4] | 0:00:20 | 50' | 78.8 | 78.8 |
| 10 | Concrete Mixer Pour Activities[4] | 1:00:00 | 50' | 79.2 | 79.2 |

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[5] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

## 4.5 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 4-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

**TABLE 4-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | Vibration Decibels (VdB) at 25 feet[1] |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large bulldozer | 87 |

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

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# 5 ON-SITE TRAFFIC NOISE IMPACTS

A noise impact analysis has been completed to determine the noise exposure levels that would result from off-site traffic noise sources, and to identify potential noise mitigation measures that would achieve acceptable Project exterior and interior noise levels. The primary source of traffic noise affecting the Project site is anticipated to be from 15th Street. The Project would also be exposed to nominal traffic noise from the Project's internal local streets. However, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a substantive contribution to ambient noise conditions. This section analyzes on-site exterior and interior noise levels at the Project buildings.

## 5.1 EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model, and the parameters outlined in Section 4, the expected future exterior noise levels at the outdoor living areas (backyards) were calculated. Table 5-1 presents a summary of future exterior noise level impacts at the outdoor living areas (backyards). The on-site transportation noise level impacts indicate that the unmitigated exterior noise levels will range from 57.0 to 66.4 dBA CNEL, as shown on Table 5-1. The on-site traffic noise analysis calculations are provided in Appendix 5.1.

To satisfy the City of Upland 60 dBA CNEL exterior noise level standard for residential land use, the construction of minimum 6-foot high noise barriers is required for outdoor living areas (backyards) of lots adjacent to 15th Street. With the recommended noise barriers shown on Exhibit ES-A, the future exterior noise levels will range from 57.0 to 59.5 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Upland 60 dBA CNEL exterior noise level standards for residential land use. The recommended noise barrier height represents the minimum wall and/or berm combination height required to satisfy the City of Upland exterior noise level standards.

**TABLE 5-1: UNMITIGATED EXTERIOR TRAFFIC NOISE LEVELS**

| Lot | Roadway | Unmitigated Noise Level (dBA CNEL) | Mitigated Noise Level (dBA CNEL) | Barrier Height (Feet) | Threshold (dBA CNEL) | Threshold Exceeded? |
|---|---|---|---|---|---|---|
| Southwest Lots | 15th St. | 66.4 | 59.5 | 6.0 | 60 | No |
| South Lots | 15th St. | 66.4 | 59.5 | 6.0' | 60 | No |
| Southeast Lots | 15th St. | 57.0 | –[1] | –[1] | –[1] | No |

[1] No exterior noise mitigation required to satisfy the exterior noise level standard.

## 5.2 INTERIOR NOISE ANALYSIS

To ensure that the interior noise levels comply with the City of Upland interior noise level standards, future noise levels were calculated at the first and second-floor building façades.

### 5.2.1 NOISE REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building facade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." (9; 20) However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are used to improve interior noise reduction, including: (1) weather-stripped solid core exterior doors; (2) upgraded dual glazed windows; (3) mechanical ventilation/air conditioning; and (4) exterior wall/roof assembles free of cut outs or openings.

### 5.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 5-2 and 5-3 show that the buildings within the Project will require a windows-closed condition and a means of mechanical ventilation (e.g. air conditioning). Table 5-2 shows that the future exterior noise levels at the first-floor building façades are expected to range from 56.7 to 60.0 dBA CNEL. The first-floor interior noise level analysis shows that the City of Upland 45 dBA CNEL residential interior noise level standard can be satisfied using standard windows and sliding glass doors with minimum STC ratings of 27.

Table 5-3 shows the future unmitigated noise levels at the second-floor building façades are expected to range from 56.7 to 64.9 dBA CNEL. The second-floor interior noise level analysis shows that the City of Upland 45 dBA CNEL residential interior noise level standard can be satisfied using standard windows and sliding glass doors with minimum STC ratings of 27.

**TABLE 5-2: FIRST-FLOOR INTERIOR NOISE IMPACTS (CNEL)**

| Lot | Noise Level at Façade[1] | Required Interior NR[2] | Estimated Interior NR[3] | Upgraded Windows[4] | Interior Noise Level[5] | Threshold | Threshold Exceeded? |
|---|---|---|---|---|---|---|---|
| Southwest Lots | 60.0 | 15.0 | 25 | No | 35.0 | 45 | No |
| South Lots | 60.0 | 15.0 | 25 | No | 35.0 | 45 | No |
| Southeast Lots | 56.7 | 11.7 | 25 | No | 31.7 | 45 | No |

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction to satisfy the interior noise standard of 45 dBA CNEL for residential use.
[3] Minimum interior noise reduction with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

**TABLE 5-3: SECOND-FLOOR INTERIOR NOISE IMPACTS (CNEL)**

| Lot | Noise Level at Façade[1] | Required Interior NR[2] | Estimated Interior NR[3] | Upgraded Windows[4] | Interior Noise Level[5] | Threshold | Threshold Exceeded? |
|---|---|---|---|---|---|---|---|
| Southwest Lots | 64.9 | 19.9 | 25 | No | 39.9 | 45 | No |
| South Lots | 64.9 | 19.9 | 25 | No | 39.9 | 45 | No |
| Southeast Lots | 56.7 | 11.7 | 25 | No | 31.7 | 45 | No |

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction to satisfy the interior noise standard of 45 dBA CNEL for residential use.
[3] Minimum interior noise reduction with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise Reduction

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# 6 RECEIVER LOCATIONS

To assess the potential for short-term construction noise impacts, the following receiver locations shown on Exhibit 6-A were identified as representative locations for focused analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Sensitive receivers near the Project site include existing single-family residential homes to the north, south, east, and west of the Project site, as described below. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 158 feet north of the Project site, R1 represents the existing residential outdoor living areas (backyards) across an existing golf course from the Project site.

R2: Located approximately 48 feet south of the Project site, R2 represents the existing residential outdoor living areas (backyards) of homes on 15$^{th}$ Street.

R3: Located approximately 83 feet south of the Project site, R3 represents the existing residential outdoor living areas (backyards) south of 15$^{th}$ Street.

R4: Located approximately 86 feet south of the Project site, R4 represents the existing residential outdoor living areas (backyards) south of 15$^{th}$ Street.

R5: Located approximately 10 feet west of the Project site, R5 represents the existing residential outdoor living areas (backyards) adjacent to the western Project site boundaries.

## EXHIBIT 6-A: RECEIVER LOCATIONS



# 7 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 7-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

**EXHIBIT 7-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS**



## 7.1 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels, previously shown on Table 4-4, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Tables 7-1 to 7-5 present the short-term construction noise levels for each stage of construction. Table 7-6 provides a summary of the construction noise levels by stage at the nearby noise-sensitive receiver locations. Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. To assess the worst-case construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity to each receiver location.

**TABLE 7-1: SITE PREPARATION MOBILE EQUIPMENT NOISE LEVELS**

| Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{max}$) |
|---|---|
| Truck Pass-Bys & Dozer Activity | 63.7 |
| Dozer Activity | 72.0 |
| Highest Reference Noise Level at 50 Feet: | 72.0 |

| Receiver Location | Distance to Construction Activity (Feet)[2] | Distance Attenuation (dBA)[3] | Estimated Noise Barrier Attenuation (dBA)[4] | Construction Noise Level (dBA $L_{max}$) |
|---|---|---|---|---|
| R1 | 168' | -10.5 | 0.0 | 61.4 |
| R2 | 58' | -1.3 | 0.0 | 70.7 |
| R3 | 93' | -5.4 | 0.0 | 66.6 |
| R4 | 96' | -5.7 | -5.0 | 61.3 |
| R5 | 20' | 8.0 | -5.0 | 74.9 |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

**TABLE 7-2: GRADING MOBILE EQUIPMENT NOISE LEVELS**

| Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{max}$) |
|---|---|
| Truck Pass-Bys & Dozer Activity | 63.7 |
| Dozer Activity | 72.0 |
| Rough Grading Activities | 80.4 |
| Highest Reference Noise Level at 50 Feet: | 80.4 |

| Receiver Location | Distance to Construction Activity (Feet)[2] | Distance Attenuation (dBA)[3] | Estimated Noise Barrier Attenuation (dBA)[4] | Construction Noise Level (dBA $L_{max}$) |
|---|---|---|---|---|
| R1 | 168' | -10.5 | 0.0 | 69.8 |
| R2 | 58' | -1.3 | 0.0 | 79.1 |
| R3 | 93' | -5.4 | 0.0 | 75.0 |
| R4 | 96' | -5.7 | -5.0 | 69.7 |
| R5 | 20' | 8.0 | -5.0 | 83.3 |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

**TABLE 7-3: BUILDING CONSTRUCTION STATIONARY EQUIPMENT NOISE LEVELS**

| Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{max}$) |
|---|---|
| Construction Vehicle Maintenance Activities | 70.4 |
| Foundation Trenching | 70.5 |
| Framing | 72.3 |
| Highest Reference Noise Level at 50 Feet: | 72.3 |

| Receiver Location | Distance to Construction Activity (Feet)[2] | Distance Attenuation (dBA)[3] | Estimated Noise Barrier Attenuation (dBA)[4] | Construction Noise Level (dBA $L_{max}$) |
|---|---|---|---|---|
| R1 | 168' | -10.5 | 0.0 | 61.7 |
| R2 | 58' | -1.3 | 0.0 | 71.0 |
| R3 | 93' | -5.4 | 0.0 | 66.9 |
| R4 | 96' | -5.7 | -5.0 | 61.6 |
| R5 | 20' | 8.0 | -5.0 | 75.2 |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

**TABLE 7-4: PAVING MOBILE EQUIPMENT NOISE LEVELS**

| Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{max}$) |
|---|---|
| Concrete Mixer Truck Movements | 73.1 |
| Concrete Paver Activities | 71.3 |
| Concrete Mixer Pour & Paving Activities | 71.9 |
| Concrete Mixer Backup Alarms & Air Brakes | 78.8 |
| Concrete Mixer Pour Activities | 79.2 |
| Highest Reference Noise Level at 50 Feet: | 79.2 |

| Receiver Location | Distance to Construction Activity (Feet)[2] | Distance Attenuation (dBA)[3] | Estimated Noise Barrier Attenuation (dBA)[4] | Construction Noise Level (dBA $L_{max}$) |
|---|---|---|---|---|
| R1 | 168' | -10.5 | 0.0 | 68.7 |
| R2 | 58' | -1.3 | 0.0 | 77.9 |
| R3 | 93' | -5.4 | 0.0 | 73.8 |
| R4 | 96' | -5.7 | -5.0 | 68.5 |
| R5 | 20' | 8.0 | -5.0 | 82.2 |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

**TABLE 7-5: ARCHITECTURAL COATING STATIONARY EQUIPMENT NOISE LEVELS**

| Reference Construction Activity[1] | Reference Noise Level @ 50 Feet (dBA $L_{max}$) |
|---|---|
| Construction Vehicle Maintenance Activities | 70.4 |
| Framing | 72.3 |
| Highest Reference Noise Level at 50 Feet: | 72.3 |

| Receiver Location | Distance to Construction Activity (Feet)[2] | Distance Attenuation (dBA)[3] | Estimated Noise Barrier Attenuation (dBA)[4] | Construction Noise Level (dBA $L_{max}$) |
|---|---|---|---|---|
| R1 | 168' | -10.5 | 0.0 | 61.7 |
| R2 | 58' | -1.3 | 0.0 | 71.0 |
| R3 | 93' | -5.4 | 0.0 | 66.9 |
| R4 | 96' | -5.7 | -5.0 | 61.6 |
| R5 | 20' | 8.0 | -5.0 | 75.2 |

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

## 7.2 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when equipment is operating at the closest point to each receiver location. As shown on Table 7-6, the unmitigated construction noise levels experienced at the nearby sensitive receiver locations are expected to range from 61.3 to 83.3 dBA $L_{max}$.

**TABLE 7-6: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

| Receiver Location[1] | Unmitigated Construction Stage Noise Level (dBA $L_{max}$) | | | | | |
|---|---|---|---|---|---|---|
| | Site Preparation | Grading | Paving | Building Construction | Architectural Coating | Highest Noise Levels[2] |
| R1 | 61.4 | 69.8 | 68.7 | 61.7 | 61.7 | 69.8 |
| R2 | 70.7 | 79.1 | 77.9 | 71.0 | 71.0 | 79.1 |
| R3 | 66.6 | 75.0 | 73.8 | 66.9 | 66.9 | 75.0 |
| R2 | 61.3 | 69.7 | 68.5 | 61.6 | 61.6 | 69.7 |
| R3 | 74.9 | 83.3 | 82.2 | 75.2 | 75.2 | 83.3 |

[1] Noise receiver locations are shown on Exhibit 7-A.
[2] Highest construction noise levels across all stages of Project construction.

Table 7-7 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 83.3 dBA $L_{max}$ and will exceed the City of Upland Municipal Code construction noise level standards of 75 dBA $L_{max}$ during temporary Project construction activities at receiver locations R2 and R5. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a *potentially significant* impact at R2 and R5 and mitigation measures are required to reduce the noise levels generated during temporary Project construction activities.

**TABLE 9-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Highest Construction Activity Noise Levels[2] | Noise Level Threshold[3] | Threshold Exceeded?[4] |
|---|---|---|---|
| R1 | 69.8 | 75 | No |
| R2 | 79.1 | 75 | Yes |
| R3 | 75.0 | 75 | No |
| R4 | 69.7 | 75 | No |
| R5 | 83.3 | 75 | Yes |

[1] Noise receiver locations are shown on Exhibit 7-A.
[2] Highest construction noise levels as shown on Table 7-6.
[3] Construction noise standards based on the maximum 20 dBA above the 55 dBA base ambient noise level standard for residential land use (City of Upland Municipal Code, Section 9.40.040 and 9.40.070)
[4] Do the estimated Project construction noise levels exceed the construction noise level thresholds?

Temporary construction noise mitigation measures are therefore required to reduce the impacts at receiver locations R2 and R5. This includes mitigation in the form of engine compartment sound dampening mats or blankets for large mobile equipment (greater than 80,000 pounds), and a 50-foot buffer for large mobile equipment (greater than 80,000 pounds) and loaded trucks, as shown on Exhibit 7-A. The construction noise mitigation measures are outlined in the Executive Summary.

The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location. With the construction noise mitigation measures identified in this noise study, shown on Exhibit 7-A, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

As shown on Table 7-8, the temporary construction noise mitigation measures will reduce the construction noise levels at the potentially impacted receiver locations to range from 64.7 to 74.1 dBA $L_{max}$ and will satisfy the 75 dBA $L_{max}$ threshold for noise-sensitive receiver locations. Therefore, the noise impact due to Project construction is considered a *less than significant* impact with mitigation.

**TABLE 7-8: MITIGATED PROJECT CONSTRUCTION NOISE LEVELS**

| Receiver Location[1] | Highest Construction Noise Levels[2] | 50-Foot Buffer Attenuation | Engine Mat/Blanket Attenuation | Mitigated Construction Noise Levels | Noise Level Threshold[3] | Threshold Exceeded?[4] |
|---|---|---|---|---|---|---|
| R1 | 69.8 | 0.0 | -5.0 | 64.8 | 75 | No |
| R2 | 79.1 | 0.0 | -5.0 | 74.1 | 75 | No |
| R3 | 75.0 | 0.0 | -5.0 | 70.0 | 75 | No |
| R4 | 69.7 | 0.0 | -5.0 | 64.7 | 75 | No |
| R5 | 83.3 | -8.0 | -5.0 | 70.4 | 75 | No |

[1] Noise receiver locations are shown on Exhibit 7-A.
[2] Highest construction noise levels as shown on Table 7-7.
[3] Construction noise standards based on the maximum 20 dBA above the 55 dBA base ambient noise level standard for residential land use (City of Upland Municipal Code, Section 9.40.040 and 9.40.070)
[4] Do the mitigated Project construction noise levels exceed the construction noise level thresholds?

## 7.3 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 4-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 7-9 presents the expected Project related vibration levels at the nearby receiver locations.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at 25 feet. At distances ranging from 20 to 168 feet from primary Project construction activities, construction vibration levels are expected to range from 62.2 to 89.9 VdB, as shown on Table 7-9. Using the construction vibration assessment methods provided by the FTA, Project construction vibration levels will exceed the FTA 80 VdB threshold at receiver location R5, and therefore, is considered a *potentially significant* impact.

**TABLE 7-9: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver Location[1] | Distance to Construction Activity (Feet) | Receiver Vibration Levels (VdB)[2] | | | | | Threshold Exceeded?[3] |
|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jackhammer | Loaded Trucks | Large Bulldozer | Highest Vibration Level | |
| R1 | 168' | 33.2 | 54.2 | 61.2 | 62.2 | 62.2 | No |
| R2 | 58' | 47.0 | 68.0 | 75.0 | 76.0 | 76.0 | No |
| R3 | 93' | 40.9 | 61.9 | 68.9 | 69.9 | 69.9 | No |
| R4 | 96' | 40.5 | 61.5 | 68.5 | 69.5 | 69.5 | No |
| R5 | 20' | 60.9 | 81.9 | 88.9 | 89.9 | 89.9 | Yes |

[1] Noise receiver locations are shown on Exhibit 7-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 4-5.
[3] Does the highest vibration level exceed the FTA maximum acceptable vibration standard of 80 VdB?

Therefore, the use of large mobile equipment (greater than 80,000 pounds) and loaded trucks within 50 feet of nearby land uses shall be prohibited unless the vibration levels are shown to be less than the 80 VdB FTA threshold. The 50-foot buffer zone for large mobile equipment (greater than 80,000 pounds) and loaded trucks is shown on Exhibit 7-A and outlined in the Executive Summary. Table 7-10 shows the mitigation Project construction vibration levels with the 50-foot buffer zone. With the recommended mitigation measures in this study, the Project-related vibration impacts at the nearby receiver locations represents a *less than significant* impact during the worst-case construction activities at the Project site.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter.

**TABLE 7-10: MITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver Location[1] | Distance to Construction Activity (Feet) | Mitigated Receiver Vibration Levels (VdB)[2] | | | | | Threshold Exceeded?[3] |
|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jackhammer | Loaded Trucks | Large Bulldozer | Highest Vibration Level | |
| R5 | 50' | 49.0 | 70.0 | 77.0 | 78.0 | 78.0 | No |

[1] Noise receiver locations are shown on Exhibit 7-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 4-5.
[3] Does the highest vibration level exceed the FTA maximum acceptable vibration standard of 80 VdB?

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# 8 REFERENCES


1. **U.S. Department of Transportation Federal Highway Administration.** Acoustical Consideration. *Noise Barrier Design Handbook.* [Online] [Cited: November 28, 2016.] https://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design03.cfm.
2. **Harris, Cyril M.** *Noise Control in Buildings.* s.l. : McGraw-Hill, Inc., 1994.
3. **Caterpillar.** *Caterpillar Perfomance Handbook.* January 2017.
4. **U.S. Department of Transportation, Federal Highway Administration.** Construction Noise Special Report. *Federal Highway Administration.* [Online] [Cited: February 8, 2017.] https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm.
5. **University of Massachusetts Lowell, Department of Work Environment.** *The Use of Noise Dampening Mats to Reduce Heavy-Equipment Noise.* September 2016.
6. **City of Upland.** *Municipal Code, Chapter 9.40 Unnecessary Noise.*
7. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
8. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
9. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.
10. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
11. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
12. **Office of Planning and Research.** *State of California General Plan Guidlines 2003.* October 2003.
13. **City of Upland.** *General Plan Safety Element, Noise.* September 2015.
14. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
15. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
16. **City of Upland.** *General Plan Circulation Element.* September 2015.
17. —. *General Plan Final Environmental Impact Report.* September 2015.
18. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
19. **Urban Crossroads, Inc.** *Upland Colonies Air Quality Impact Analysis.* July 2018.
20. **California Department of Transportation.** *Traffic Noise Analysis Protocol.* May 2011.

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# 9 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Upland Colonies Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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## EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

## PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

## PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

## PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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# APPENDIX 3.1:

# CITY OF UPLAND MUNICIPAL CODE

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# Chapter 9.40 UNNECESSARY NOISE

## Note

* Prior ordinance history: Ord. 947.

## 9.40.010 Purpose.

The purpose of this chapter is to establish criteria and standards for the regulation of noise levels within the city. (Prior code § 5400.100)

## 9.40.020 Definitions.

As used in this chapter, specific words and phrases are defined as follows:

"Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise.

"Average noise level" means the logarithmic average of noise samples taken over a specified length of time.

"Commercial purpose" means the use, operation or maintenance of any sound-amplifying equipment for the purpose of advertising any business, goods, or services and/or for the purpose of advertising or attracting the attention of the public to or soliciting patronage from any performance, entertainment, exhibition or event, or for the purpose of demonstrating any such sound equipment.

"Construction material manufacturer" means any use located on the same property as the mining industry, manufacturing products including concrete, asphalt, concrete blocks, concrete pipe, roofing tile or other similar materials.

"Cumulative time period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

"Decibel (dB)" means a measurement unit of sound pressure level which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio.

"Impact noise" means the sound produced by the impact or collision of one moving object or mass with a second object or mass that is stationary or moving.

"Intrusive noise" means a sound which intrudes over and above the existing ambient noise level at a given location.

"Mining industry" means any industry which extracts sand and gravel resources from the ground.

"Motor driven vehicle" means and includes, but is not limited to, any automobile, truck, van, bus, motorcycle, minibike, go-cart or other self-propelled vehicle, on or off road.

"Noise" means any sound that is loud or disturbing or that interferes with one's ability to hear some other sound.

"Noise level" means the "A" weighted sound pressure level in decibels audible to humans obtained by using a sound level meter. The unit of noise level measurement shall be designated as dB(A).

"Person" means a person, firm, association, co-partnership, joint venture, corporation, or any entity, public or private in nature.

"Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

"Sound pressure level of a sound," in decibels, means 20 times the logarithm to the base 10 of the ratio of the pressure of this sound to the reference pressure, which reference pressure shall be explicitly stated. (Prior code § 5400.300)

## 9.40.030 Noise level measurement criteria.

A. Any noise level measurement, made pursuant to the provisions of this chapter, shall be determined by using a sound level meter that meets the minimum requirements of the American National Standard Institute for sound level meters, or by using an instrument with associated recording and analyzing equipment that will provide equivalent data.

B. The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The sound level of the objectionable noise;
2. The sound level of the ambient noise;
3. The proximity of the noise to residential sleeping facilities;
4. The nature and zoning of the area within which the noise emanates;
5. The number of persons affected by the noise source;
6. The time of day or night the noise occurs;
7. The duration of the noise and its tonal, informational, or musical content;
8. Whether the noise is continuous, recurrent, or intermittent;
9. Whether the noise is produced by a commercial or noncommercial activity.

C. The above considerations shall be considered in addition to the noise levels set forth in this section in determining a violation. However, noises do not necessarily need to exceed those noise level limits to be considered unnecessary or unusual so as to cause discomfort or annoyance to persons in the area. (Prior code § 5400.400)

## 9.40.040 Base ambient noise level.

All ambient noise measurements shall commence at the base ambient noise levels in decibels within the respective times and zones as follows:

| Decibels | Time | Zone Use |
|---|---|---|
| 45 dB(A) | 10:00 p.m.—7:00 a.m. | Residential |
| 55 dB(A) | 7:00 a.m.—10:00 p.m. | Residential |
| 65 dB(A) | Anytime | Uses not specified |
| 75 dB(A) | Anytime | Industrial and commercial |

Actual decibel measurements exceeding the above levels at the times and within the zones corresponding thereto shall be employed as the base ambient noise level referred to in this chapter. Otherwise, no ambient noise shall be deemed to be less than the above specified levels. (Prior code § 5400.500)

## 9.40.050 Exterior noise level measurement.

Exterior noise levels shall be measured at any point relative to the closest point of the source of the noise at the property line on the affected property. Measurements will not be made during extraordinary times, such as during the movement of a nearby train or airplane. (Prior code § 5400.600)

## 9.40.060 Excessive noise unlawful.

A. It is unlawful for any person at any location to create any noise, or to allow the creation of any noise, when such noise causes the noise level to exceed any noise level for the cumulative time periods specified below in Section 9.40.070 and Section 9.40.080.

B. Furthermore, notwithstanding any specified noise level, it is also unlawful for any person to wilfully make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person residing in the area, and it is unlawful for any person in ownership or control of any premises to knowingly permit a violation of this section upon the premises. (Prior code § 5400.700)

## 9.40.070 Maximum residential noise levels.

Exterior noise shall be measured on the exterior of any residential property, and no noise level shall exceed the following for the duration periods specified:

| Noise Level Exceeded | Maximum Duration Period |
|---|---|
| Base ambient noise level (BANL) | 30 minutes in any hour |
| 5 dB(A) above BANL | 15 minutes in any hour |
| 10 dB(A) above BANL | 5 minutes in any hour |
| 15 dB(A) above BANL | 1 minute in any hour |
| 20 d(B)(A) above BANL | Not permitted |

(Prior code § 5400.800)

## 9.40.080 Maximum nonresidential noise levels.

Measured on the exterior of nonresidential properties, no noise level shall exceed the respective base ambient noise levels for nonresidential land uses as determined by development standards established by the regulating agency. (Prior code § 5400.900)

## 9.40.090 Mining industry allowed noise levels for residential property.

A. Exemptions. This section shall supersede all the provisions of Sections 9.40.040 and 9.46.070 relative to allowed noise for mining industry.

B. Allowed Levels. The allowed maximum exterior average sound level in any hour at any property zoned for residential use shall be as follows:

| Mining Industry Use and Days Allowed | Times | Allowed Levels |
|---|---|---|
| **Monday—Friday:** | | |
| Quarry/plant | 6 a.m.—6 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—6 p.m. | 55 dB(A) |
| **Saturday:** | | |
| Quarry/plant | 7 a.m.—3 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—3 p.m. | 55 dB(A) |
| **All Times:** | | |
| Quarry/plant | | 45 dB(A) |
| Construction material manufacturer | | 45 dB(A) |

C. Exceptions. Exceptions may be granted in the event of a proven emergency situation or required by a public agency and written authorization is obtained from the city manager or designee prior to quarry, plant or construction

material manufacturer operations being conducted. The maximum exterior sound level at any property zoned for residential use shall not exceed 55 dB(A) during such exception.

D. Measurement Parameters.

1. Measurements shall be made to the one-tenth decibel, but shall be reported to the integer value. Values of 0.1 to 0.4 shall be rounded down to the lower integer. Values of 0.5 to 0.9 shall be rounded up to the higher integer.

2. If measurements are made for more than one hour, the subsequent measurements shall be made on one hour increments. For a series of one hour measurements, compliance shall be determined by the highest average hourly reading. Measurements shall be started on the hour and ended on the hour.

3. Measurements of less than one hour, extrapolated to one hour shall not be used to determine compliance or violation.

4. Measurements will be made on the "A" weighted scale and a slow response.

E. Measurement Location. Exterior measurements shall be at locations on residential property that are considered accessible for normal and usual outdoor human activity and which are intended and used for such purposes. The receptor shall be placed at five feet above the ground surface and 10 feet from any reflecting surface. When these conditions cannot be met, the actual location utilized shall be noted in writing.

F. Calibration. Prior to, and after each measurement period, the sound level meter shall be calibrated using an acoustic calibrator of the coupler type.

Each year, the sound level meter and acoustic calibrator shall be calibrated to manufacturers' specifications by a laboratory subject to the National Bureau of Standards.

G. Ambient Noise.

1. Compliance applies only to the alleged offending source. Preferably, an ambient measurement will be measured at the affected property while the source is nonoperational and immediately prior to or immediately after the measurement period while the source is operating. If this procedure is not feasible and the source operation cannot be controlled, then an ambient measurement will be made at some other location in the vicinity that in the judgment of the measurement technician is representative of the situation at the affected property.

2. If the ambient level is below the source level by 10 dB(A) or more, then the measurement with the source in operation will be equivalent to the source alone within the prescribed resolution. If the ambient level is less than 10 dB(A) lower than the source, then the ambient level will be subtracted logarithmically from the combined measurement to determine the actual source level. If the ambient level is higher than the source level, the source will be considered to comply regardless of its level.

H. Record Keeping. When applying this section for an enforcement action, the following information, as a minimum, shall be recorded and maintained:

1. The date, start time, stop time, average "A" weighted sound level, meter scale when appropriate, slow or fast response, equipment manufacturer, model number and serial number, and the ambient sound level shall be documented.

2. The location of the source, the property measurement point, and the ambient measurement point shall be documented and scaled dimensionally. Photos are not necessary but encouraged. The data sheets shall be signed and dated by the measurement technician.

3. In the event auxiliary recording devices are used for data storage, then settings shall be listed, and equipment type, manufacturer, model and serial number listed.

I. Verification. If data is to be used for enforcement purposes, the technician will certify in writing that the data recorded was from the source and that all procedures have been complied with in the measurement and reporting. (Prior code § 5400.950)

## 9.40.100 Noises prohibited—Unnecessary noise standard.

The following acts are declared to be loud, disturbing and unnecessary noises in violation of this chapter, but such enumeration shall not be deemed to be exclusive, namely:

A. Impact, Repetitive and Tone Noise Levels. In the event any offending noise consists primarily of impact noise, repetitive noise, or simple tone noise, each of the maximum permitted noise levels specified in Section 9.40.070 of this chapter shall be reduced by five dB(A).

B. Radios, Televisions and Stereos. It is unlawful for any person to play, use, operate, or permit to be played, used or operated any radio, television set, musical instrument, phonograph, stereophonic equipment, jukebox or other machine or device for producing, reproducing or amplifying sound when audible at a distance of 50 feet or more from the source of the sound and/ or when audible within any other residence or establishment.

C. Hawkers and Peddlers. It is unlawful for any person to sell anything by public outcry within any area of the city. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, and other similar licensed public entertainment events.

D. Drums and Musical Instruments. It is unlawful for any person to use any drum or other percussion or musical instrument or device of any kind for the purpose of attracting attention by the creation of noise within the city.

E. Machinery, Equipment, Fans and Air Conditioning. It is unlawful for any person to operate, cause to operate or permit the operation of any machinery, equipment, device, pump, fan, compressor, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient noise base level by five dB(A).

F. Motor Driven Vehicles. It is unlawful for any person to operate any motor driven vehicle within the city that, due to the nature of the operation of the vehicle, or due to the operating condition of the vehicle, or due to any modification made to the vehicle, generates noise so that a reasonable person is caused discomfort or annoyance.

G. Horns, Signaling Devices. It is unlawful for any person to cause the sounding of any horn or signaling device on any automobile, motorcycle, street car or other motor driven vehicle on any street or public place of the city, except as a danger warning; to create by means of any such signaling device any unreasonably loud or harsh sound; and to create the sounding of any such device for an unnecessary and unreasonable period of time. It is unlawful for any person to use any signaling device except one operated by hand or electricity; to use any horn, whistle or other device operated by engine exhaust; or to use any such signaling device when traffic is for any reason held up.

H. Loudspeakers, Amplifiers for Advertising. It is unlawful for any person to use, operate or permit to be played, used, or operated any radio receiving set, musical instrument, phonograph, loudspeaker, sound amplifier, or other machine or device for the producing or reproducing of sound which is cast upon the public streets for the purpose of commercial advertising or attracting the attention of the public to any building or structure.

I. Yelling, Shouting. It is unlawful for any person to yell, shout, hoot, whistle, or sing on the public streets, particularly between the hours of 11:00 p.m. and 7:00 a.m., or at any time or place so as to annoy or disturb the quiet, comfort, or repose of any persons in the vicinity.

J. Animals and Fowl. It is unlawful for any person to keep or maintain, or to permit such activity, upon any premises owned, or occupied, or controlled by such person any animal or fowl otherwise permitted to be kept which, by any sound, cry, or behavioral noise, causes annoyance or discomfort to a reasonable person in any residential neighborhood.

K. Exhaust. It is unlawful for any person to discharge into the open air the exhaust of any steam engine, stationary internal combustion engine, motorboat, or motor driven vehicle except through a muffler or other device which will effectively prevent loud or explosive noises therefrom.

L. Loading, Unloading, Opening Boxes. It is unlawful for any person to create any loud and excessive noise in connection with loading or unloading any vehicle or the opening and destruction of bales, boxes, crates, and containers.

M. Construction or Repairing of Buildings. It is unlawful for any person to engage in or permit the erection (including excavation), demolition, alteration or repair of any building other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days or less while the emergency continues, and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be

impaired by the erection, demolition, alteration or repair of any building or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he or she shall further determine that loss or inconvenience would result to any party in interest, he or she may grant permission for such work to be done within the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work.

N. Metal Rails, Pillars and Columns—Transportation Thereof. It is unlawful for any person to transport rails, pillars or columns of iron, steel or other material over and along streets and other public places upon carts, trays, cars, trucks, or in any other manner so loaded as to cause loud noises or as to disturb the peace and quiet of such streets or other public places.

O. Hammers, Etc. It is unlawful for any person to operate between the hours of 10:00 p.m. and 7:00 a.m. any steam shovel, pneumatic hammer, derrick, steam or electric hoist or other appliance, the use of which is attended by loud or unusual noise.

P. Blowers. It is unlawful for any person to operate any noise-creating blower or power fan or any internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device sufficient to deaden such noise.

Q. Exceptions. This section shall not apply to persons who are participants in events for which they have obtained a valid permit from the city and have been authorized to engage in such conduct. (Prior code § 5400.1000)

### 9.40.110 Violation a misdemeanor.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined an amount not exceeding $1,000.00, or be imprisoned in the city or county jail for a period not exceeding six months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder. (Prior code § 5400.1100)

### 9.40.120 Manner of enforcement.

Violations of this chapter shall be prosecuted in the same manner as other misdemeanor violations of the city's code. (Prior code § 5400.1200)

### 9.40.130 Additional remedy—Injunction.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provision hereof and which causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health or peace of residents in the area shall be deemed, and is declared to be, a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction. (Prior code § 5400.1300)

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# APPENDIX 5.1:

# ON-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Backyard With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 43.0 feet |
| *Barrier Distance to Observer:* | 10.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 43.050 |
| *Medium Trucks:* | 42.710 |
| *Heavy Trucks:* | 42.562 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | 0.87 | -1.20 | *0.29* | -7.430 | -10.430 |
| *Medium Trucks:* | 74.83 | -16.61 | 0.92 | -1.20 | *0.17* | -6.560 | -9.560 |
| *Heavy Trucks:* | 80.05 | -20.56 | 0.95 | -1.20 | *0.01* | -5.100 | -8.100 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 65.4 | 63.5 | 61.7 | 55.7 | 64.3 | 64.9 |
| *Medium Trucks:* | 57.9 | 56.4 | 50.1 | 48.5 | 57.0 | 57.2 |
| *Heavy Trucks:* | 59.2 | 57.8 | 48.8 | 50.0 | 58.4 | 58.5 |
| *Vehicle Noise:* | 66.9 | 65.2 | 62.2 | 57.3 | 65.9 | 66.4 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.0 | 56.1 | 54.3 | 48.3 | 56.9 | 57.5 |
| *Medium Trucks:* | 51.4 | 49.9 | 43.5 | 42.0 | 50.4 | 50.7 |
| *Heavy Trucks:* | 54.1 | 52.7 | 43.7 | 44.9 | 53.3 | 53.4 |
| *Vehicle Noise:* | 60.1 | 58.4 | 55.0 | 50.6 | 59.1 | 59.5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Backyard With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 43.0 feet |
| *Barrier Distance to Observer:* | 10.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 43.050 |
| *Medium Trucks:* | 42.710 |
| *Heavy Trucks:* | 42.562 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | 0.87 | -1.20 | *0.29* | -7.430 | -10.430 |
| *Medium Trucks:* | 74.83 | -16.61 | 0.92 | -1.20 | *0.17* | -6.560 | -9.560 |
| *Heavy Trucks:* | 80.05 | -20.56 | 0.95 | -1.20 | *0.01* | -5.100 | -8.100 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 65.4 | 63.5 | 61.7 | 55.7 | 64.3 | 64.9 |
| *Medium Trucks:* | 57.9 | 56.4 | 50.1 | 48.5 | 57.0 | 57.2 |
| *Heavy Trucks:* | 59.2 | 57.8 | 48.8 | 50.0 | 58.4 | 58.5 |
| *Vehicle Noise:* | 66.9 | 65.2 | 62.2 | 57.3 | 65.9 | 66.4 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.0 | 56.1 | 54.3 | 48.3 | 56.9 | 57.5 |
| *Medium Trucks:* | 51.4 | 49.9 | 43.5 | 42.0 | 50.4 | 50.7 |
| *Heavy Trucks:* | 54.1 | 52.7 | 43.7 | 44.9 | 53.3 | 53.4 |
| *Vehicle Noise:* | 60.1 | 58.4 | 55.0 | 50.6 | 59.1 | 59.5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Backyard With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 170.0 feet |
| *Centerline Dist. to Observer:* | 180.0 feet |
| *Barrier Distance to Observer:* | 10.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 179.969 |
| *Medium Trucks:* | 179.920 |
| *Heavy Trucks:* | 179.925 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -8.45 | -1.20 | *-1.09* | 0.000 | 0.000 |
| *Medium Trucks:* | 74.83 | -16.61 | -8.45 | -1.20 | *-1.15* | 0.000 | 0.000 |
| *Heavy Trucks:* | 80.05 | -20.56 | -8.45 | -1.20 | *-1.31* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 56.1 | 54.2 | 52.4 | 46.4 | 55.0 | 55.6 |
| *Medium Trucks:* | 48.6 | 47.1 | 40.7 | 39.2 | 47.6 | 47.9 |
| *Heavy Trucks:* | 49.8 | 48.4 | 39.4 | 40.6 | 49.0 | 49.1 |
| *Vehicle Noise:* | 57.6 | 55.8 | 52.9 | 48.0 | 56.6 | 57.0 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 56.1 | 54.2 | 52.4 | 46.4 | 55.0 | 55.6 |
| *Medium Trucks:* | 48.6 | 47.1 | 40.7 | 39.2 | 47.6 | 47.9 |
| *Heavy Trucks:* | 49.8 | 48.4 | 39.4 | 40.6 | 49.0 | 49.1 |
| *Vehicle Noise:* | 57.6 | 55.8 | 52.9 | 48.0 | 56.6 | 57.0 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* First Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 53.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 53.025 |
| *Medium Trucks:* | 52.686 |
| *Heavy Trucks:* | 52.745 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -0.49 | -1.20 | *0.32* | -7.600 | -10.600 |
| *Medium Trucks:* | 74.83 | -16.61 | -0.44 | -1.20 | *0.16* | -6.480 | -9.480 |
| *Heavy Trucks:* | 80.05 | -20.56 | -0.45 | -1.20 | *0.00* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 64.1 | 62.2 | 60.4 | 54.3 | 63.0 | 63.6 |
| *Medium Trucks:* | 56.6 | 55.1 | 48.7 | 47.2 | 55.6 | 55.9 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.4 | 48.6 | 57.0 | 57.1 |
| *Vehicle Noise:* | 65.6 | 63.8 | 60.9 | 56.0 | 64.5 | 65.0 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 56.5 | 54.6 | 52.8 | 46.7 | 55.4 | 56.0 |
| *Medium Trucks:* | 50.1 | 48.6 | 42.2 | 40.7 | 49.1 | 49.4 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.4 | 48.6 | 57.0 | 57.1 |
| *Vehicle Noise:* | 60.6 | 59.0 | 54.2 | 51.2 | 59.7 | 60.0 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* First Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 53.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 53.025 |
| *Medium Trucks:* | 52.686 |
| *Heavy Trucks:* | 52.745 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -0.49 | -1.20 | *0.32* | -7.600 | -10.600 |
| *Medium Trucks:* | 74.83 | -16.61 | -0.44 | -1.20 | *0.16* | -6.480 | -9.480 |
| *Heavy Trucks:* | 80.05 | -20.56 | -0.45 | -1.20 | *0.00* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 64.1 | 62.2 | 60.4 | 54.3 | 63.0 | 63.6 |
| *Medium Trucks:* | 56.6 | 55.1 | 48.7 | 47.2 | 55.6 | 55.9 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.4 | 48.6 | 57.0 | 57.1 |
| *Vehicle Noise:* | 65.6 | 63.8 | 60.9 | 56.0 | 64.5 | 65.0 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 56.5 | 54.6 | 52.8 | 46.7 | 55.4 | 56.0 |
| *Medium Trucks:* | 50.1 | 48.6 | 42.2 | 40.7 | 49.1 | 49.4 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.4 | 48.6 | 57.0 | 57.1 |
| *Vehicle Noise:* | 60.6 | 59.0 | 54.2 | 51.2 | 59.7 | 60.0 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* First Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 170.0 feet |
| *Centerline Dist. to Observer:* | 190.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 189.971 |
| *Medium Trucks:* | 189.924 |
| *Heavy Trucks:* | 189.929 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -8.80 | -1.20 | *-0.54* | 0.000 | 0.000 |
| *Medium Trucks:* | 74.83 | -16.61 | -8.80 | -1.20 | *-0.60* | 0.000 | 0.000 |
| *Heavy Trucks:* | 80.05 | -20.56 | -8.80 | -1.20 | *-0.76* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 55.7 | 53.8 | 52.1 | 46.0 | 54.6 | 55.3 |
| *Medium Trucks:* | 48.2 | 46.7 | 40.4 | 38.8 | 47.3 | 47.5 |
| *Heavy Trucks:* | 49.5 | 48.1 | 39.0 | 40.3 | 48.6 | 48.8 |
| *Vehicle Noise:* | 57.2 | 55.5 | 52.6 | 47.7 | 56.2 | 56.7 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 55.7 | 53.8 | 52.1 | 46.0 | 54.6 | 55.3 |
| *Medium Trucks:* | 48.2 | 46.7 | 40.4 | 38.8 | 47.3 | 47.5 |
| *Heavy Trucks:* | 49.5 | 48.1 | 39.0 | 40.3 | 48.6 | 48.8 |
| *Vehicle Noise:* | 57.2 | 55.5 | 52.6 | 47.7 | 56.2 | 56.7 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Second Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 53.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 14.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 54.489 |
| *Medium Trucks:* | 53.944 |
| *Heavy Trucks:* | 52.999 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -0.66 | -1.20 | *-0.26* | 0.000 | 0.000 |
| *Medium Trucks:* | 74.83 | -16.61 | -0.60 | -1.20 | *-0.46* | 0.000 | 0.000 |
| *Heavy Trucks:* | 80.05 | -20.56 | -0.48 | -1.20 | *-1.24* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 63.9 | 62.0 | 60.2 | 54.2 | 62.8 | 63.4 |
| *Medium Trucks:* | 56.4 | 54.9 | 48.6 | 47.0 | 55.5 | 55.7 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.3 | 48.6 | 56.9 | 57.1 |
| *Vehicle Noise:* | 65.4 | 63.7 | 60.7 | 55.8 | 64.4 | 64.9 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 63.9 | 62.0 | 60.2 | 54.2 | 62.8 | 63.4 |
| *Medium Trucks:* | 56.4 | 54.9 | 48.6 | 47.0 | 55.5 | 55.7 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.3 | 48.6 | 56.9 | 57.1 |
| *Vehicle Noise:* | 65.4 | 63.7 | 60.7 | 55.8 | 64.4 | 64.9 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Second Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **6.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 53.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 14.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 54.489 |
| *Medium Trucks:* | 53.944 |
| *Heavy Trucks:* | 52.999 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -0.66 | -1.20 | *-0.26* | 0.000 | 0.000 |
| *Medium Trucks:* | 74.83 | -16.61 | -0.60 | -1.20 | *-0.46* | 0.000 | 0.000 |
| *Heavy Trucks:* | 80.05 | -20.56 | -0.48 | -1.20 | *-1.24* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 63.9 | 62.0 | 60.2 | 54.2 | 62.8 | 63.4 |
| *Medium Trucks:* | 56.4 | 54.9 | 48.6 | 47.0 | 55.5 | 55.7 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.3 | 48.6 | 56.9 | 57.1 |
| *Vehicle Noise:* | 65.4 | 63.7 | 60.7 | 55.8 | 64.4 | 64.9 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 63.9 | 62.0 | 60.2 | 54.2 | 62.8 | 63.4 |
| *Medium Trucks:* | 56.4 | 54.9 | 48.6 | 47.0 | 55.5 | 55.7 |
| *Heavy Trucks:* | 57.8 | 56.4 | 47.3 | 48.6 | 56.9 | 57.1 |
| *Vehicle Noise:* | 65.4 | 63.7 | 60.7 | 55.8 | 64.4 | 64.9 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

*Scenario:* Second Floor With Wall
*Road Name:* 15th St.
*Lot No:* 0

*Project Name:* Upland
*Job Number:* 11824
*Analyst:* A. Wolfe

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 14,100 vehicles |
| *Peak Hour Percentage:* | 10% |
| *Peak Hour Volume:* | 1,410 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 170.0 feet |
| *Centerline Dist. to Observer:* | 190.0 feet |
| *Barrier Distance to Observer:* | 20.0 feet |
| *Observer Height (Above Pad):* | 14.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Barrier Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 190.421 |
| *Medium Trucks:* | 190.265 |
| *Heavy Trucks:* | 190.000 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 65.11 | 0.63 | -8.81 | -1.20 | *-3.81* | 0.000 | 0.000 |
| *Medium Trucks:* | 74.83 | -16.61 | -8.81 | -1.20 | *-3.98* | 0.000 | 0.000 |
| *Heavy Trucks:* | 80.05 | -20.56 | -8.80 | -1.20 | *-4.41* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 55.7 | 53.8 | 52.1 | 46.0 | 54.6 | 55.2 |
| *Medium Trucks:* | 48.2 | 46.7 | 40.3 | 38.8 | 47.3 | 47.5 |
| *Heavy Trucks:* | 49.5 | 48.1 | 39.0 | 40.3 | 48.6 | 48.8 |
| *Vehicle Noise:* | 57.2 | 55.5 | 52.5 | 47.6 | 56.2 | 56.7 |

***Mitigated Noise Levels (with Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 55.7 | 53.8 | 52.1 | 46.0 | 54.6 | 55.2 |
| *Medium Trucks:* | 48.2 | 46.7 | 40.3 | 38.8 | 47.3 | 47.5 |
| *Heavy Trucks:* | 49.5 | 48.1 | 39.0 | 40.3 | 48.6 | 48.8 |
| *Vehicle Noise:* | 57.2 | 55.5 | 52.5 | 47.6 | 56.2 | 56.7 |

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# APPENDIX I:

# TRAFFIC IMPACT ANALYSIS

# Upland Colonies

## TRAFFIC IMPACT ANALYSIS

### CITY OF UPLAND

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JUNE 6, 2019

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| CA MUTCD | California Manual on Uniform Traffic Control Devices |
| Caltrans | California Department of Transportation |
| CEQA | California Environmental Quality Act |
| CMP | Congestion Management Program |
| DIF | Development Impact Fee |
| E+P | Existing Plus Project |
| HCM | Highway Capacity Manual |
| ITE | Institute of Transportation Engineers |
| LOS | Level of Service |
| N/A | Not Applicable |
| NCHRP | National Cooperative Highway Research Program |
| NP | No Project (or Without Project) |
| PHF | Peak Hour Factor |
| Project | Upland Colonies |
| RTP | Regional Transportation Plan |
| SBCTA | San Bernardino County Transportation Authority |
| SCAG | Southern California Association of Governments |
| SCS | Sustainable Communities Strategy |
| TIA | Traffic Impact Analysis |
| v/c | Volume to Capacity |
| Vphgpl | Vehicles Per Hour Green Per Lane |
| WP | With Project |

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# 1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Upland Colonies development (referred to as "Project") located north of 15th Street and west of Alta Avenue in the City of Upland, as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. This traffic study has been prepared in accordance with the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update) and the approved traffic study scoping agreement which is provided in Appendix 1.1 of this report. (1)

## 1.1 PROJECT OVERVIEW

The Project is proposed to consist of 66 single family detached residential dwelling units. For the purposes of this traffic study, the Project is anticipated to be developed in a single phase with an Opening Year of 2020. Vehicular traffic access will be provided via Driveways 1 and 2 on 15th Street, both providing full access (i.e., no turning movement restrictions).

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (2) The Project is estimated to generate a net total of 623 trip-ends per day on a typical weekday with approximately 50 AM peak hour trips and 65 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

## 1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential impacts to traffic and circulation have been assessed for each of the following conditions:

- Existing (2018)
- Existing plus Project (E+P)
- Opening Year Cumulative (2020) Without Project
- Opening Year Cumulative (2020) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

### 1.2.1 EXISTING (2018) CONDITIONS

Existing (2018) conditions represents the baseline traffic conditions as they existed at the time this report was prepared.

## EXHIBIT 1-1: PRELIMINARY SITE PLAN






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URBAN CROSSROADS

### 1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions. The E+P analysis is intended to identify the project-specific traffic impacts associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing (2018) conditions.

### 1.2.3 OPENING YEAR CUMULATIVE (2020) CONDITIONS

The Opening Year Cumulative (2020) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. As directed by City of Upland staff, an ambient growth factor of 4.04% from Existing conditions for 2020 conditions is utilized to account for other cumulative development projects in conjunction with background traffic growth for Opening Year Cumulative traffic conditions (at 2.0% per year, compounded annually over 2 years).

The adopted Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (April 2016) growth forecasts for City of Upland identifies projected growth in population from 74,700 in 2012 to 81,700 in 2040, or a 9.37% increase over the 28-year period. The change in population equates to roughly a 0.32 percent growth rate, compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 11.58 percent, or 0.39 percent annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 37.22 percent, or a 1.14 percent annual growth rate. (3) In other words, the use of a 2.0 percent per year growth rate would likely overstate, as opposed to understate, potential impacts as the rate is in excess of the anticipated regional growth.

### 1.2.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the SCAG transportation model. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the County's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Upland (lead agency). If the planned and funded improvements can provide the target LOS, then the Project's payment into established fee programs will be considered as cumulative mitigation. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-DIF facilities) are identified as such.

## 1.3 STUDY AREA INTERSECTIONS

The following 7 study area intersections listed in Table 1-1 and shown on Exhibit 1-2 were selected for this TIA based on where the Project is anticipated to contribute 50 or more peak hour trips, or if the intersection provides access to the Project.

**TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS**

| ID | Intersection Location | Jurisdiction | CMP Intersection? |
|---|---|---|---|
| 1 | Campus Avenue & 14th Street | City of Upland | No |
| 2 | Driveway 1 & 15th Street – Future Intersection | City of Upland | No |
| 3 | Driveway 2 & 15th Street – Future Intersection | City of Upland | No |
| 4 | Alta Avenue & 15th Street | City of Upland | No |
| 5 | Alta Avenue & 14th Street | City of Upland | No |
| 6 | Alta Avenue & Foothill Boulevard (SR-66) | City of Upland | No |
| 7 | Grove Avenue & Foothill Boulevard (SR-66) | City of Upland, City of Rancho Cucamonga | Yes |

The "50 peak hour trip" criterion utilized by the City of Upland is consistent with the methodology employed by the County of San Bernardino, and generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively impacted by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely-utilized tool for estimating a potential area of impact (i.e., study area). Some study area intersections have been added at the request of City staff through the scoping process, although the Project is anticipated to contribute less than 50 peak hour trips.

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The County of San Bernardino CMP became effective with the passage of Proposition 111 in 1990 and updated most recently in 2007. The San Bernardino County Transportation Authority (SBCTA) adopted the 2007 CMP for the County of San Bernardino in December 2007. (1) There is 1 study area intersection identified as a CMP facility (see Table 1-1).

## EXHIBIT 1-2: LOCATION MAP




**LEGEND:**

0 = EXISTING INTERSECTION ANALYSIS LOCATION

0 = FUTURE INTERSECTION ANALYSIS LOCATION

0 = CMP INTERSECTION

N

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URBAN CROSSROADS

## 1.4 ANALYSIS FINDINGS

This section provides a summary of the intersection analysis results for Existing (2018), E+P, Opening Year Cumulative (2020) Without and With Project, and Horizon Year (2040) Without and With Project conditions.

### 1.4.1 EXISTING (2018) CONDITIONS

All study area intersections are currently operating at an acceptable LOS during the peak hours under Existing (2018) traffic conditions. As such, no improvements are necessary.

### 1.4.2 E+P CONDITIONS

All study area intersections are anticipated to continue to operate at an acceptable LOS during both peak hours with the addition of Project traffic under E+P traffic conditions. As such, no improvements are necessary.

### 1.4.3 OPENING YEAR CUMULATIVE (2020) CONDITIONS

All study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2020) Without and With Project traffic conditions. As such, no improvements are necessary.

### 1.4.4 HORIZON YEAR (2040) CONDITIONS

All study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Horizon Year (2040) Without and With Project traffic conditions. As such, no improvements are necessary.

## 1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Upland are funded through a combination of direct project mitigation, development impact fee programs or fair share contributions, such as the City of Upland Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

### 1.5.1 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in September 2017. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study.

While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past, and will continue to fund, new transportation facilities in San Bernardino County, including within the City of Upland.

### 1.5.2 CITY OF UPLAND DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of Upland adopted the latest update to their DIF program in February 2015. Fees from new residential, commercial and industrial development are collected to fund Measure "I" compliant regional facilities as well as local facilities. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

After the City's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Engineering Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds. The City's DIF program establishes a timeline to fund, design, and build the improvements.

### 1.5.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs (e.g., DIF), construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City of Upland's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements.

## 1.6 IMPACTS AND MITIGATION MEASURES

This section provides a summary of Project impacts and associated mitigation measures. Section 2 *Methodologies* provides information on the methodologies used in the analyses and Section 5 *E+P Traffic Analysis* and Section 6 *Opening Year Cumulative (2020) Traffic Analysis* include the detailed analyses. All the study area intersections operate at acceptable level of service (LOS) for all the scenarios (see Exhibit 1-3). Therefore, there are no direct or cumulative impacts.

## 1.7 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. Vehicular traffic access will be provided via Driveways 1 and 2 on 15th Street, both providing full access (i.e., no turning movement restrictions).

Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements are required to be in place prior to occupancy.

Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

### 1.7.1 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-4 illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

***Driveway 1 & 15th Street (#2)*** – Install a stop control on the southbound approach and construct the intersection with the following geometrics:

Northbound Approach: Not Applicable (N/A)

Southbound Approach: One shared left-right turn lane.

Eastbound Approach: One shared left-through lane.

Westbound Approach: One shared through-right turn lane.

***Driveway 2 & 15th Street (#3)*** – Install a stop control on the southbound approach and construct the intersection with the following geometrics:

Northbound Approach: N/A

Southbound Approach: One shared left-right turn lane.

Eastbound Approach: One shared left-through lane.

Westbound Approach: One shared through-right turn lane.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to Caltrans and City of Upland sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

**EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO**

| # | Intersection | Existing (2018) | E+P | Opening Year (2020) Without Project | Opening Year (2020) With Project | Horizon Year (2040) Without Project | Horizon Year (2040) With Project |
|---|---|---|---|---|---|---|---|
| 1 | Campus Av. & 14th St. | | | | | | |
| 2 | Dwy. 1 & 15th St. | NA | | NA | | NA | |
| 3 | Dwy. 2 & 15th St. | NA | | NA | | NA | |
| 4 | Alta Av. & 15th St. | | | | | | |
| 5 | Alta Av. & 14th St. | | | | | | |
| 6 | Alta Av. & Foothill Bl. (SR-66) | | | | | | |
| 7 | Grove Av. & Foothill Bl. (SR-66) | | | | | | |

**LEGEND:**

- = AM PEAK HOUR
- = PM PEAK HOUR
- = ACCEPTABLE LOS A-D
- = DEFICIENT LOS E
- = DEFICIENT LOS F

NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

## EXHIBIT 1-4: SITE ACCESS RECOMMENDATIONS




**LEGEND:**

- = STOP SIGN
- = LANE IMPROVEMENT
- = EXISTING LANE

N

# 2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Upland traffic study guidelines.

## 2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

## 2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) 6th Edition methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (5) The HCM uses different procedures depending on the type of intersection control.

### 2.2.1 SIGNALIZED INTERSECTIONS

The City of Upland and City of Rancho Cucamonga require signalized intersection operations analysis based on the methodology described in the HCM 6th Edition. Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 10) analysis software package.

**TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with very low delay occurring with favorable progression and/or short cycle length. | 0 to 10.00 | A | F |
| Operations with low delay occurring with good progression and/or short cycle lengths. | 10.01 to 20.00 | B | F |

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.01 to 35.00 | C | F |
| Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.01 to 55.00 | D | F |
| Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.01 to 80.00 | E | F |
| Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths. | 80.01 and up | F | F |

Source: HCM, 6th Edition

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

*Existing and Opening Year Cumulative Traffic Conditions:*

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (5)

### 2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Upland and City of Rancho Cucamonga require the operations of unsignalized intersections be evaluated using the methodology described the HCM 6th Edition. (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

**TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS**

| Description | Average Control Delay Per Vehicle (Seconds) | Level of Service, V/C ≤ 1.0 | Level of Service, V/C > 1.0 |
|---|---|---|---|
| Little or no delays. | 0 to 10.00 | A | F |
| Short traffic delays. | 10.01 to 15.00 | B | F |
| Average traffic delays. | 15.01 to 25.00 | C | F |
| Long traffic delays. | 25.01 to 35.00 | D | F |
| Very long traffic delays. | 35.01 to 50.00 | E | F |
| Extreme traffic delays with intersection capacity exceeded. | > 50.00 | F | F |

Source: HCM 6

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

## 2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD) for all unsignalized study area intersections. (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

As shown in Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

**TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS**

| ID | Intersection Location | Jurisdiction |
|---|---|---|
| 2 | Driveway 1 & 15th Street – Future Intersection | City of Upland |
| 3 | Driveway 2 & 15th Street – Future Intersection | City of Upland |
| 4 | Alta Avenue & 15th Street | City of Upland |
| 5 | Alta Avenue & 14th Street | City of Upland |

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Analysis*, Section 6 *Opening Year Cumulative (2020) Traffic Analysis* and Section 7 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

## 2.4 MINIMUM LEVEL OF SERVICE (LOS)

### 2.4.1 CITY OF UPLAND

The City of Upland 2015 General Plan has established minimum LOS standards. Specifically, General Plan Policies CIR-1.1c and CIR-1.1d establish minimum standards to be applied o any TIA, as follows:

- Policy CIR-1.1c: Strive to maintain LOS D at all intersections outside of the Downtown Specific Plan area and the Transit Priority Roadways except where such improvements are physically infeasible or would negatively impact bicyclists, pedestrians, or transit patrons.
- Policy CIR-1.1d: Strive to maintain LOS E at all intersections within the Downtown Specific Plan area and intersections along the Transit Priority Roadways.

### 2.4.2 CITY OF RANCHO CUCAMONGA

Per the City's General Plan Mobility Element, the City of Rancho Cucamonga allows LOS D to be used as the maximum acceptable threshold for study area intersections and roadways.

### 2.4.3 SAN BERNARDINO COUNTY CMP

Per the San Bernardino County CMP, the acceptable LOS of service for CMP intersections is LOS E or better. The intersection of Grove Avenue and Foothill Boulevard is a CMP intersection.

## 2.5 THRESHOLDS OF SIGNIFICANCE

To determine whether the addition of Project traffic at a study intersection results in a significant impact, the following thresholds of significance will be utilized:

- Any study intersection that is operating at a LOS A, B, C, or D for any study scenario without Project traffic in which the addition of Project traffic causes the intersection to degrade to LOS E or LOS F shall mitigate that impact so as to bring the intersection back to at least LOS D.
- Any study intersection that is operating at LOS E or LOS F for any study scenario without Project traffic shall mitigate any impacts so as to bring the intersection back to at least LOS D.

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring additional improvements to maintain acceptable level of service operations with or without the Project. A Project's contribution to a significant cumulative impact can be reduced to less-than-significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact. Cumulatively considerable is defined as the addition of 50 or more peak hour trips, and all facilities that would receive 50 or more peak hour trips from the Project are evaluated in this report.

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# 3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Upland General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

## 3.1 EXISTING CIRCULATION NETWORK

The study area includes a total of 7 intersections as shown previously on Exhibit 1-2 where the Project is anticipated to contribute 50 or more peak hour trips, or have been added at the City's request. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

## 3.2 CITY OF UPLAND GENERAL PLAN CIRCULATION ELEMENT

### 3.2.1 CITY OF UPLAND

As previously noted, the Project site is located within the City of Upland. Exhibit 3-2 shows the City of Upland General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Upland General Plan roadway cross-sections.

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Upland in the vicinity of the proposed Project as identified on the City's General Plan Circulation Element are described subsequently.

Major Arterial can accommodate four travel lanes and may have raised or painted medians. These roadways experience the most traffic within the City. The following study area roadway within the City of Upland is classified as a Major Arterial:

- Foothill Boulevard (SR-66)

The following study area roadway within the City of Upland is classified as a Secondary Arterial:

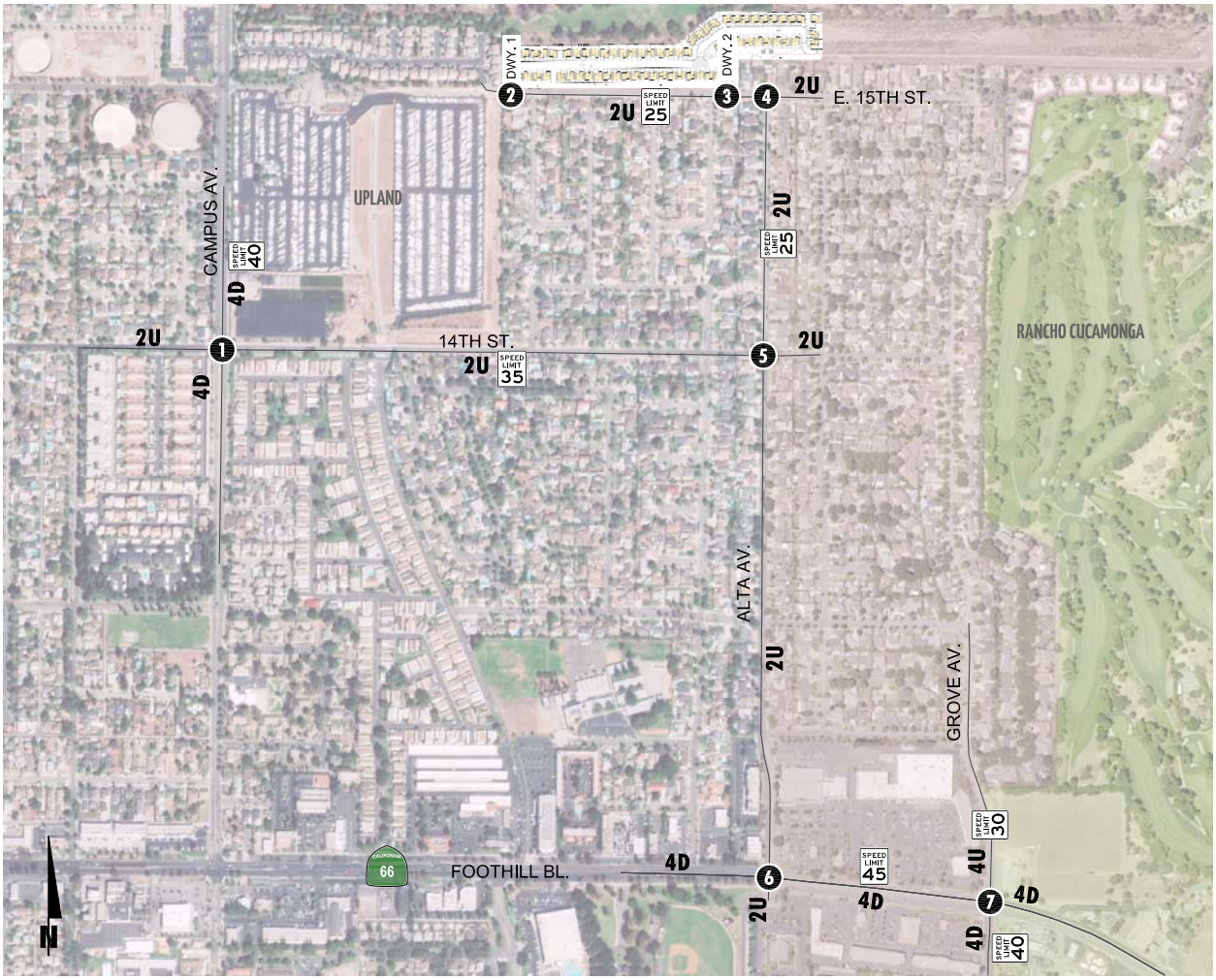
- Campus Avenue

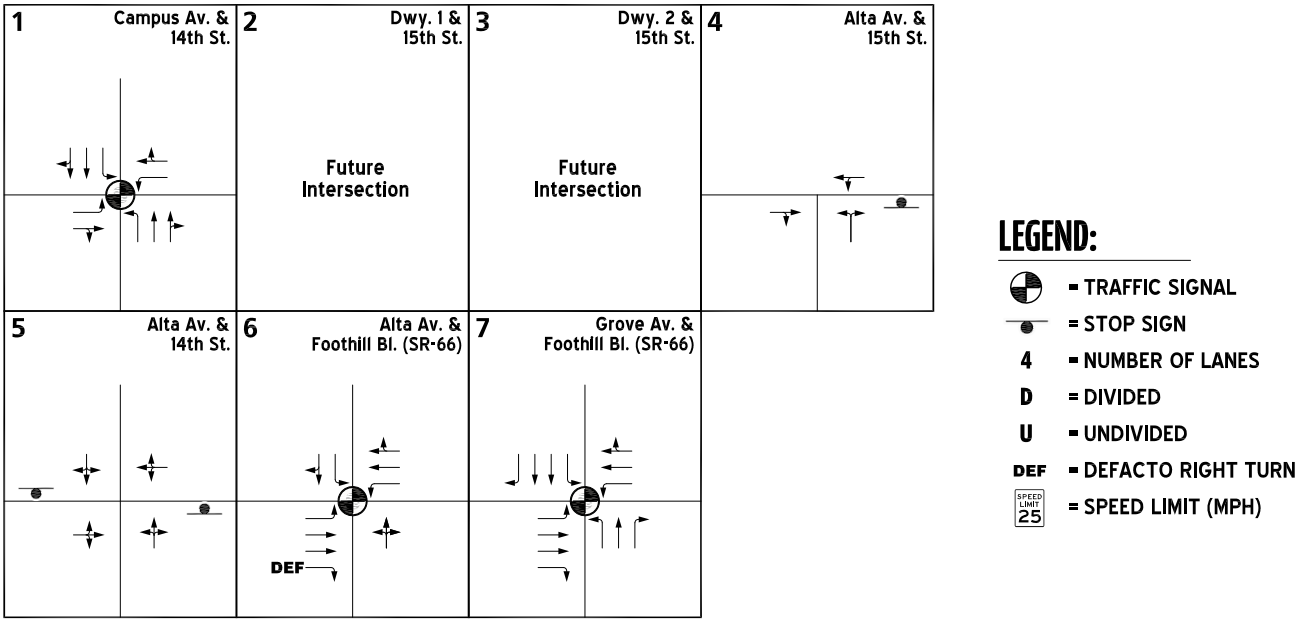
### 3.2.2 CITY OF RANCHO CUCAMONGA

Exhibit 3-4 shows the City of Rancho Cucamonga General Plan Circulation Element, and Exhibit 3-5 illustrates the City of Rancho Cucamonga General Plan roadway cross-sections. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadway within the study area, as identified on the City of Rancho Cucamonga General Plan Circulation Element, is described subsequently.

***Foothill Boulevard (SR-66) –*** Foothill Boulevard (SR-66) is classified as a Major Divided Arterial and Major Divided Highway with 120 to 146-foot right-of-way on the City of Rancho Cucamonga General Plan Circulation Element.

## EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

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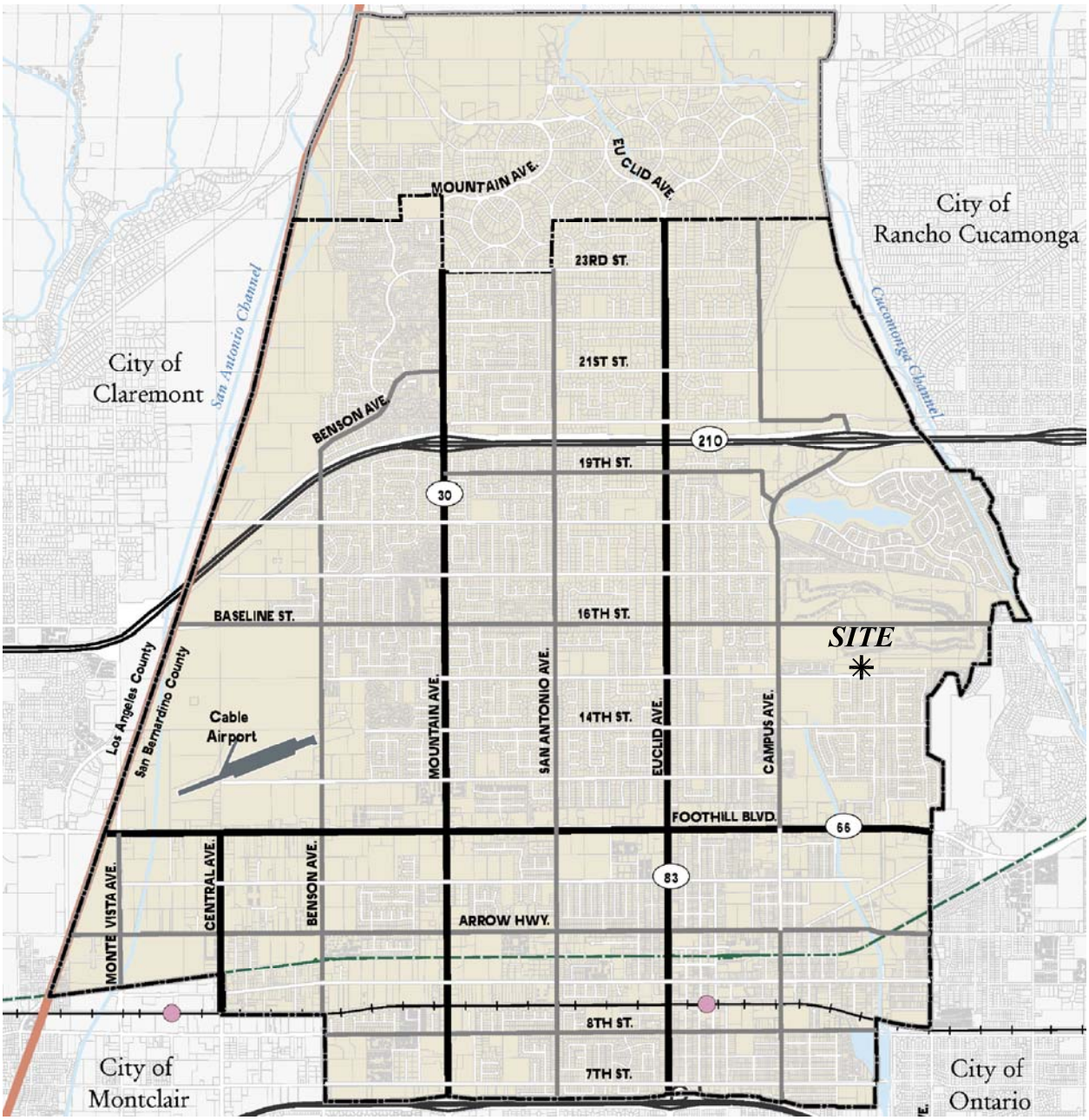
## EXHIBIT 3-2: CITY OF UPLAND GENERAL PLAN CIRCULATION ELEMENT




SOURCE: CITY OF UPLAND

**LEGEND:**

- County Boundary
- Sphere of Influence
- City Limits
- Upland Parcel
- Southern Pacific Trail
- Rail Line
- Metrolink Station

Street Type
- Major Arterials
- Secondary Arterials
- Collector Streets

N

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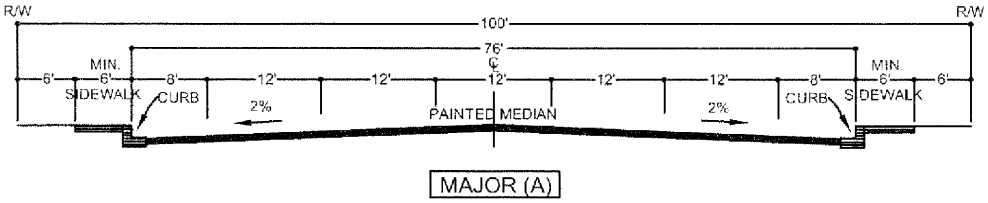
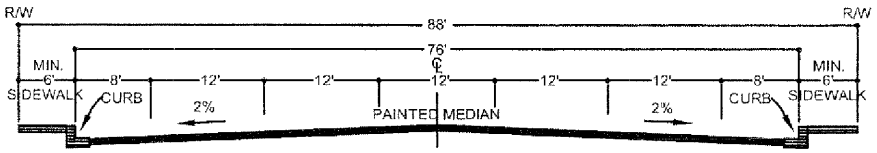
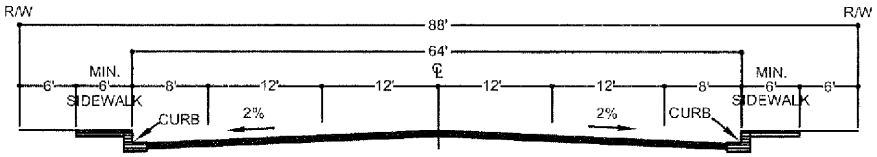
## EXHIBIT 3-3: CITY OF UPLAND GENERAL PLAN ROADWAY CROSS-SECTIONS



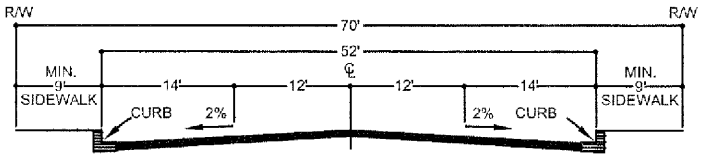

MAJOR (A)



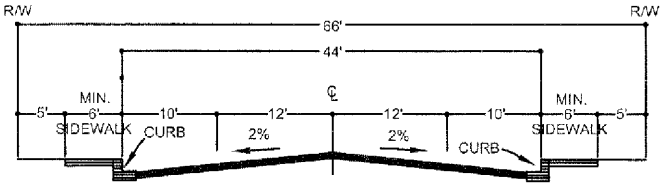

MAJOR (B)




SECONDARY (A)



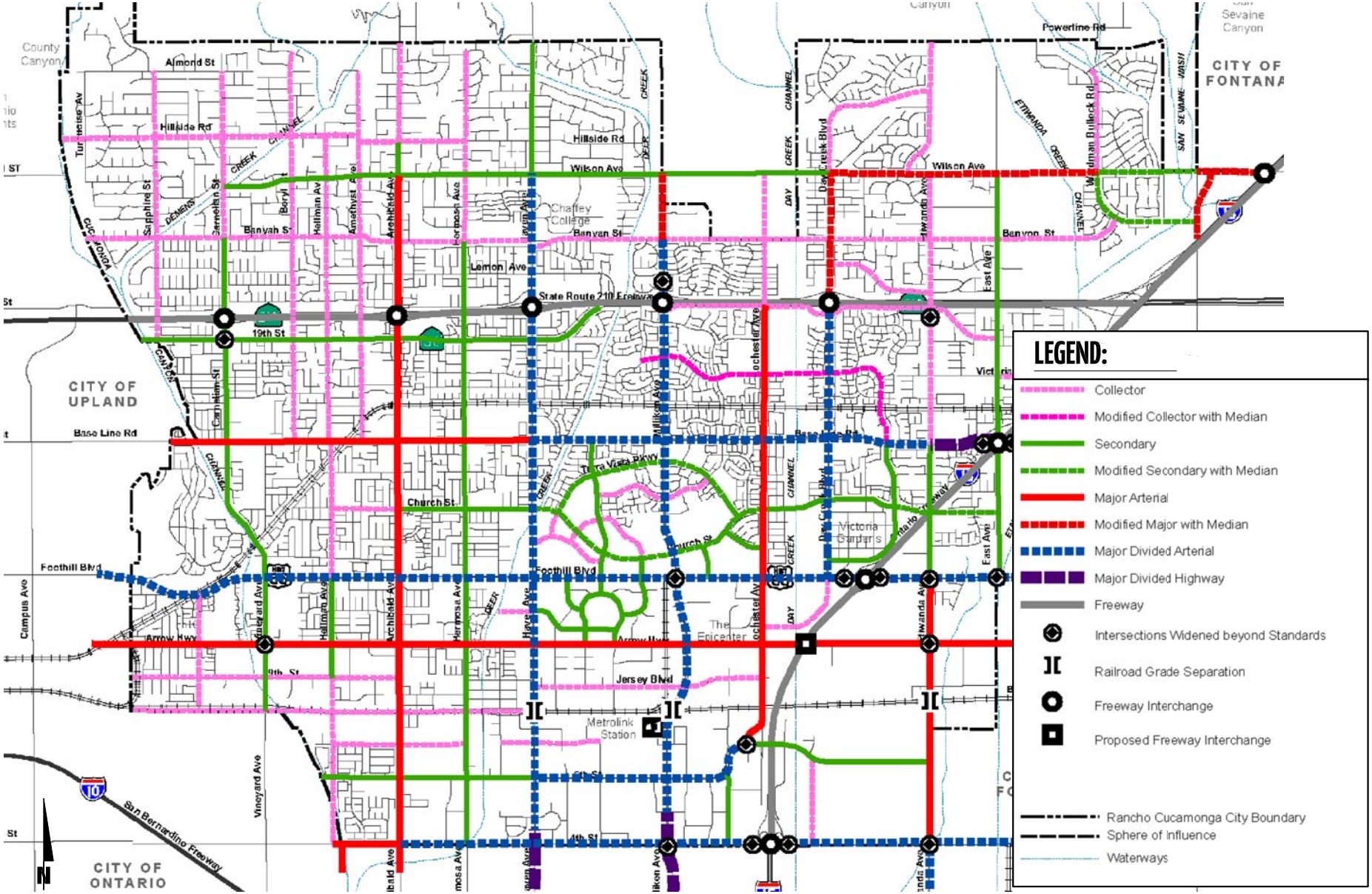

SECONDARY (B)



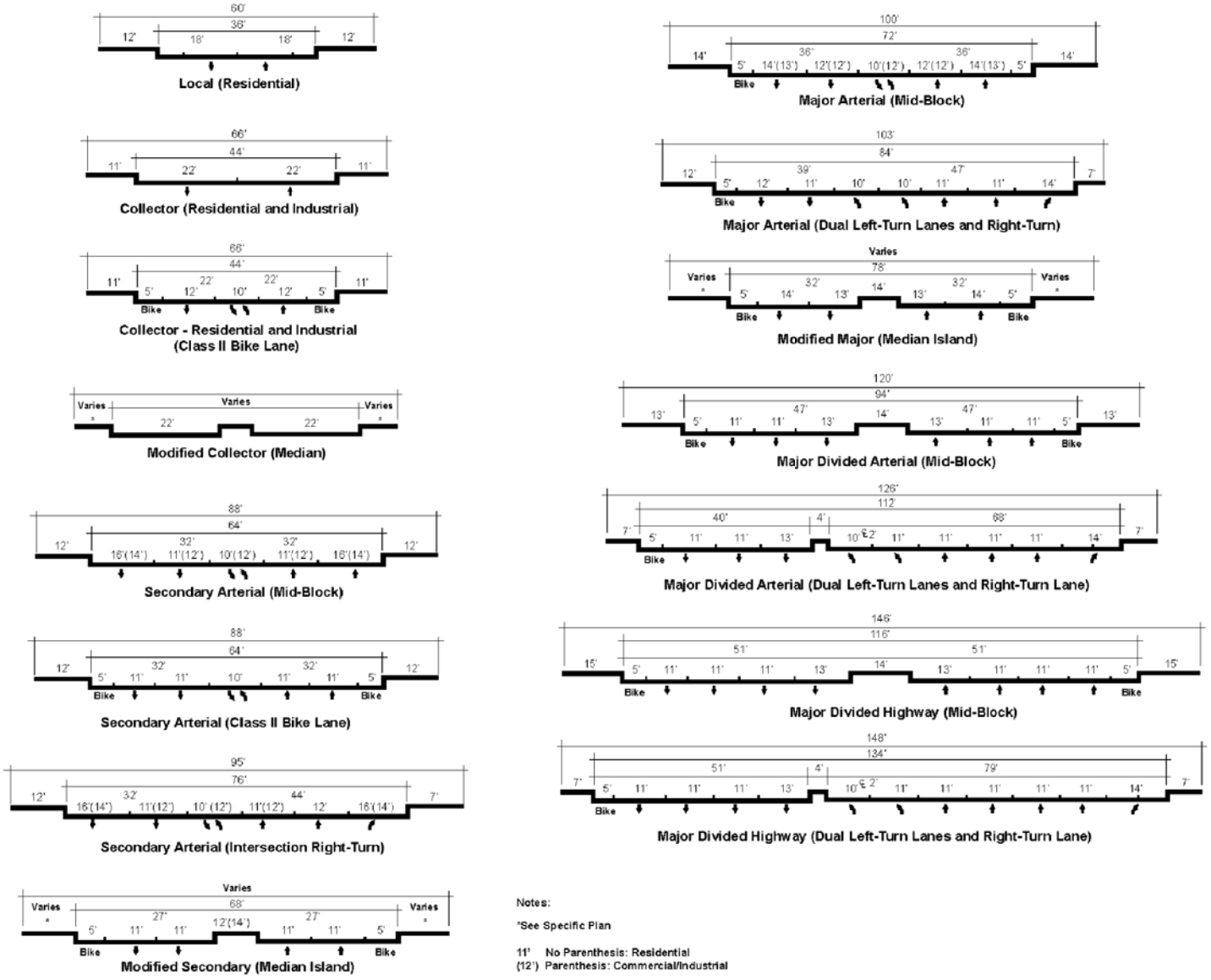

COLLECTOR

**SOURCE: CITY OF UPLAND**

## EXHIBIT 3-4: CITY OF RANCHO CUCAMONGA GENERAL PLAN CIRCULATION ELEMENT



## EXHIBIT 3-5: CITY OF RANCHO CUCAMONGA ROADWAY CROSS-SECTIONS




Notes:

*See Specific Plan

11' No Parenthesis: Residential
(12') Parenthesis: Commercial/Industrial

## 3.3 BICYCLE & PEDESTRIAN FACILITIES

Exhibit 3-6 illustrates the City of Upland bicycle routes, which identifies Campus Avenue with existing Class III bike lanes that will be upgraded to Class II bike lanes. Campus Avenue is a priority bike route based on its proximity to Downtown and to improve the connections between Downtown and Memorial Park. Foothill Boulevard (SR-66) is identified with Class II/III bike lanes within the study area. Exhibit 3-7 illustrates the City of Rancho Cucamonga bike routes, which shows Class II bike lanes along Foothill Boulevard (SR-66) within the study area. Exhibit 3-8 identifies the City of Upland parks, trails and recreation facilities. Exhibit 3-9 shows the City of Upland's pedestrian facilities. A portion of Campus Avenue, north of 14th Street, is identified as a pedestrian needs priority area where sidewalks may be incomplete. Existing pedestrian facilities within the study area are shown on Exhibit 3-10.

## 3.4 TRANSIT SERVICE

The study area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County, with bus service along Foothill Road (SR-66) (and a portion of Campus Avenue and Grove Avenue) via Route 66 and Route 86. The existing bus routes provided within the area by Omnitrans are shown on Exhibit 3-11. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

## 3.5 EXISTING (2018) TRAFFIC COUNTS

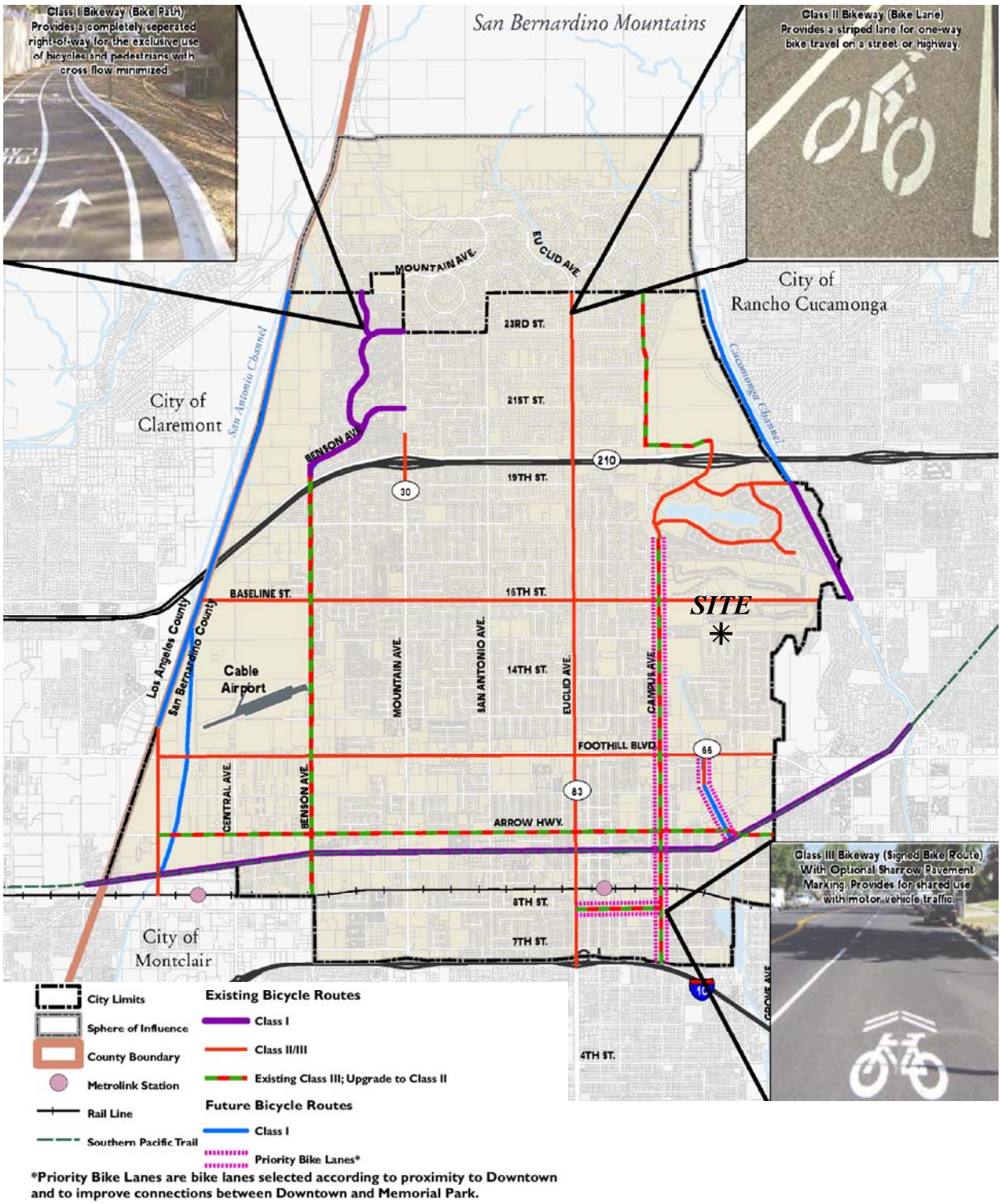
The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in July 2018. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

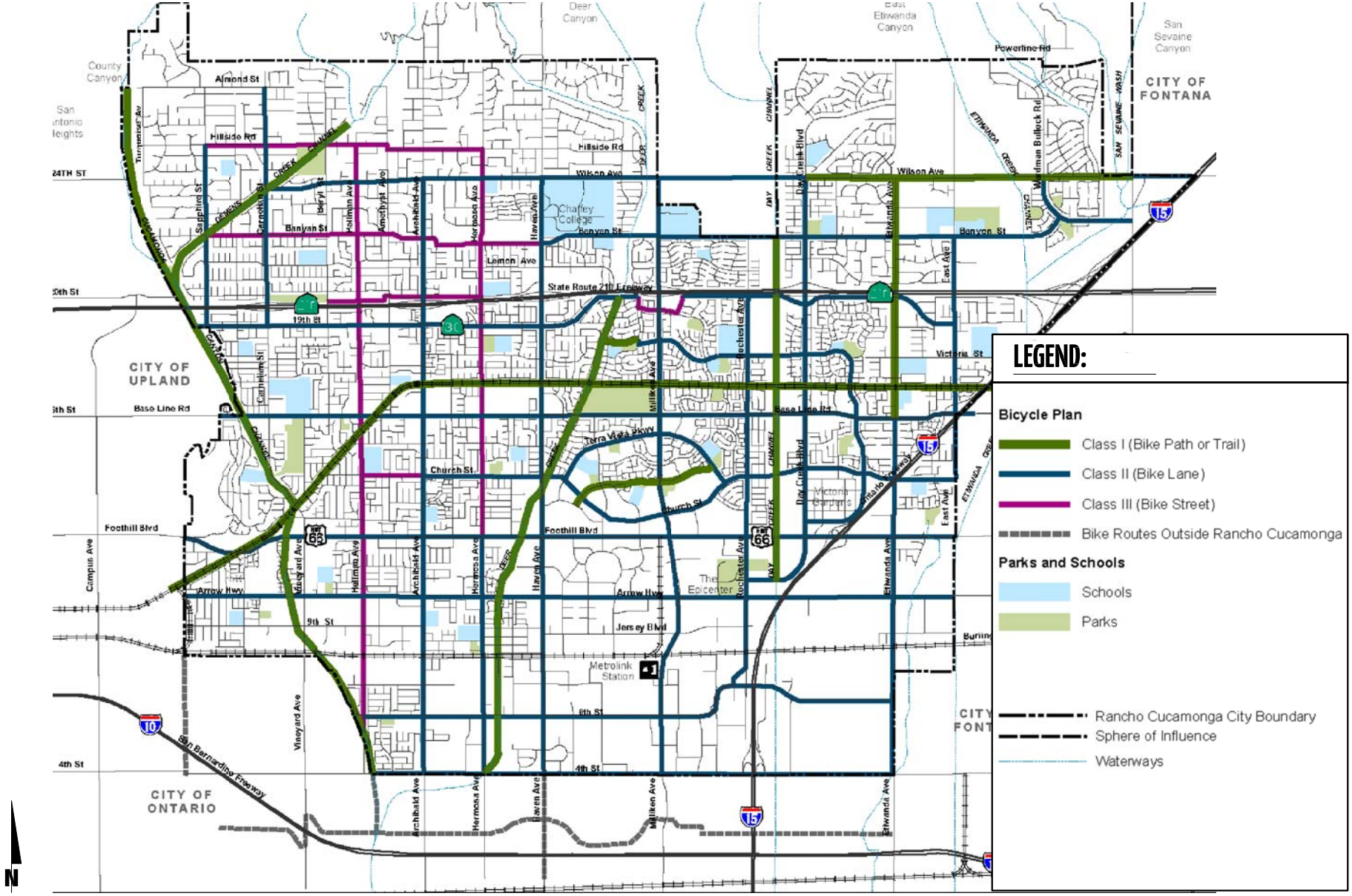
The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.).

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes. However, local schools were not in session. As such, local school traffic was manually added to the study area intersections based on the current student population for the 2017 school year and based on the service boundary for each school (see Appendix 3.2 of this report for trip generation and distribution assumptions). The resulting school only weekday AM and PM peak hour intersection volumes are shown on Exhibit 3-12.

## EXHIBIT 3-6: CITY OF UPLAND BICYCLE ROUTES



## EXHIBIT 3-7: CITY OF RANCHO CUCAMONGA BIKE ROUTES

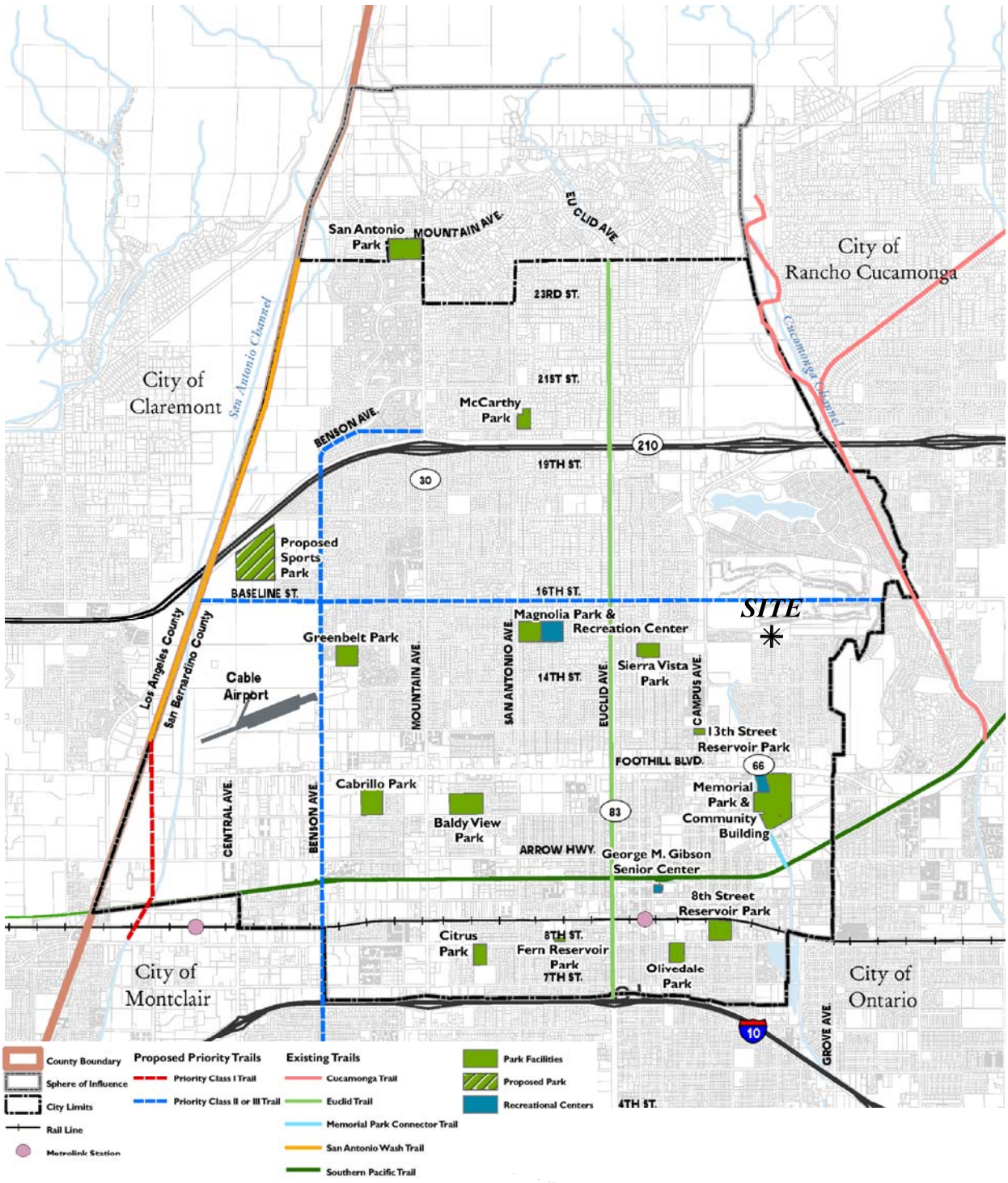




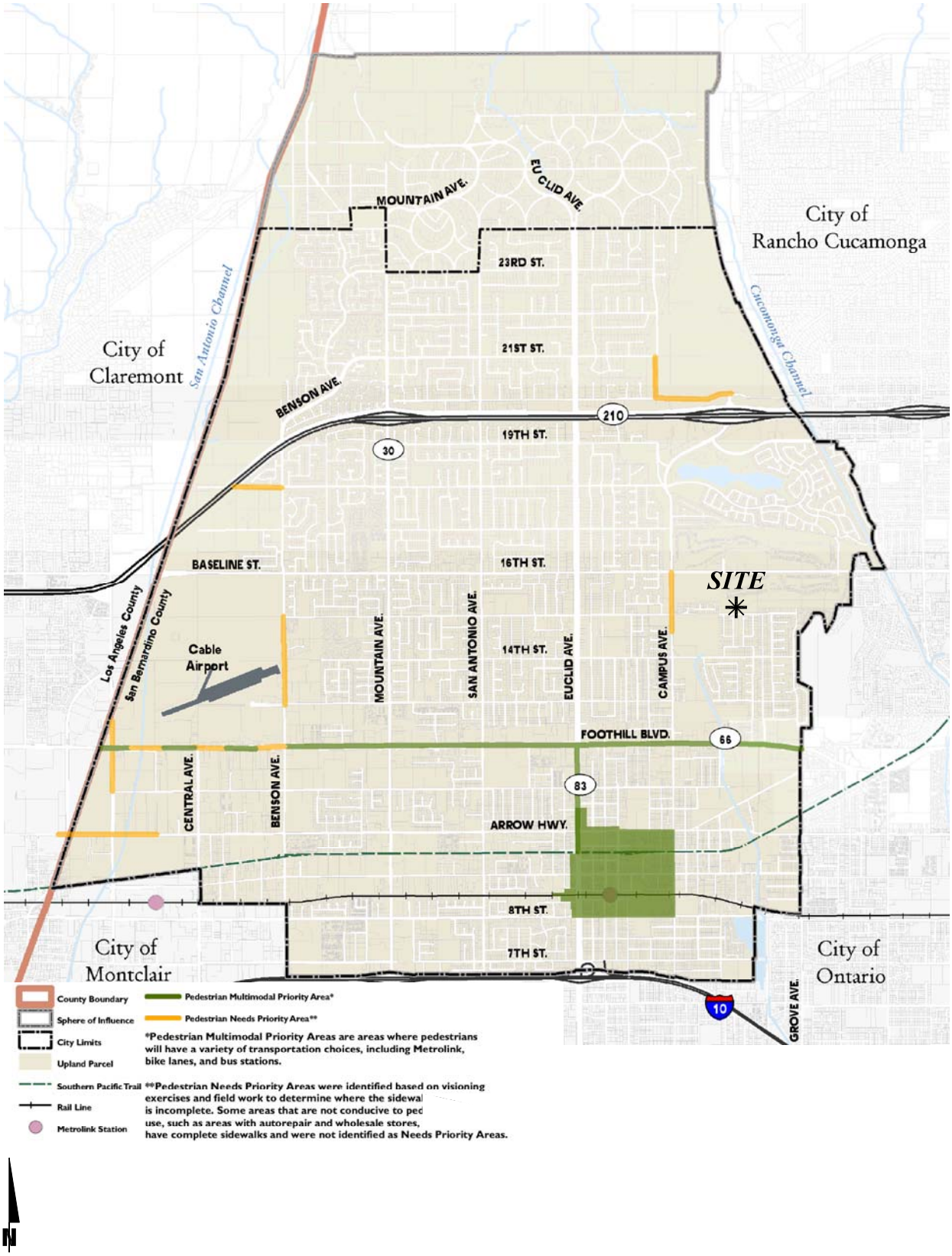

*11822 - bikes-rancho.dwg*

URBAN CROSSROADS

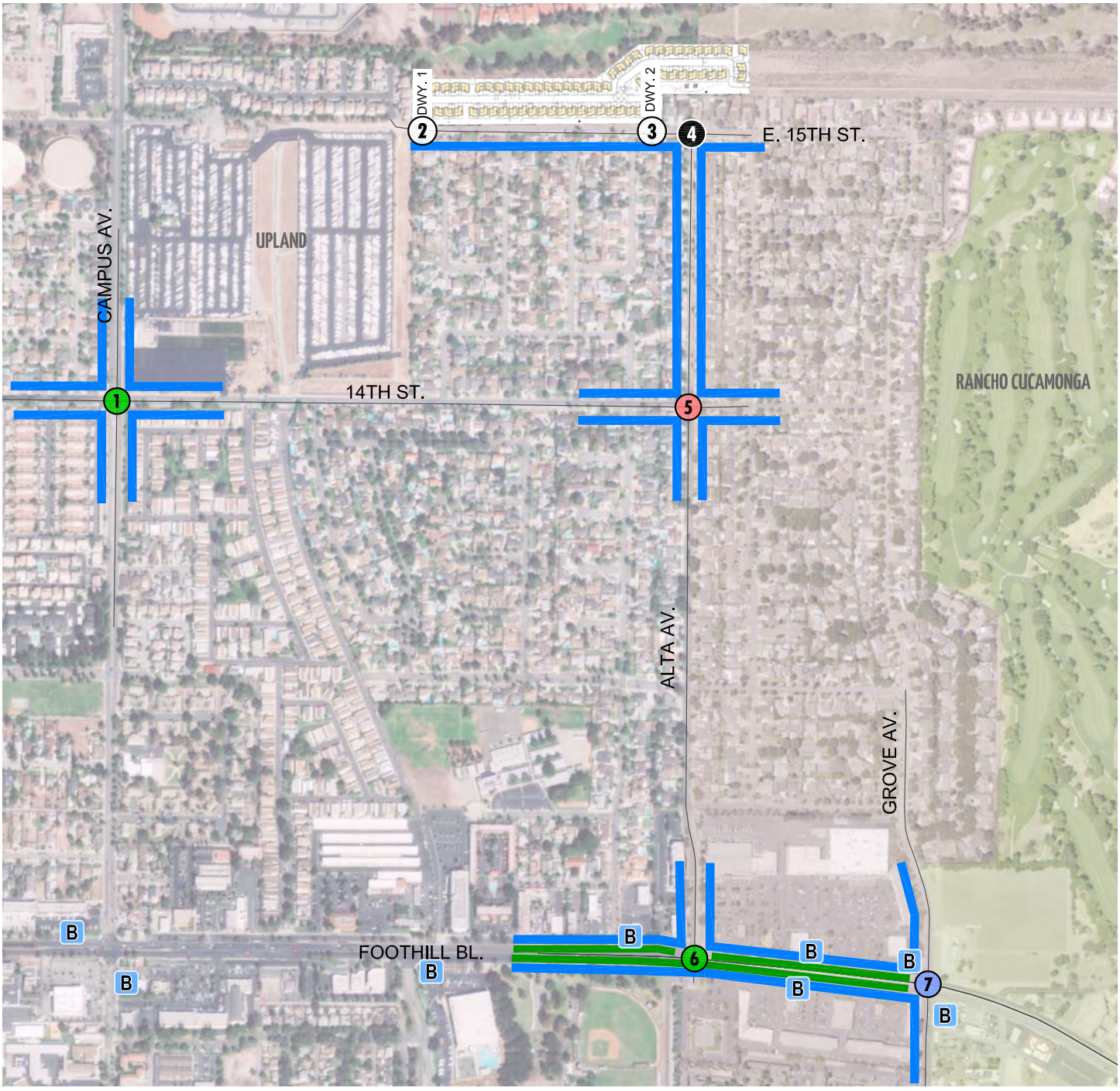
## EXHIBIT 3-8: CITY OF UPLAND PARKS, TRAILS AND RECREATION FACILITIES



## EXHIBIT 3-9: CITY OF UPLAND PEDESTRIAN FACILITIES



## EXHIBIT 3-10: EXISTING PEDESTRIAN FACILITIES



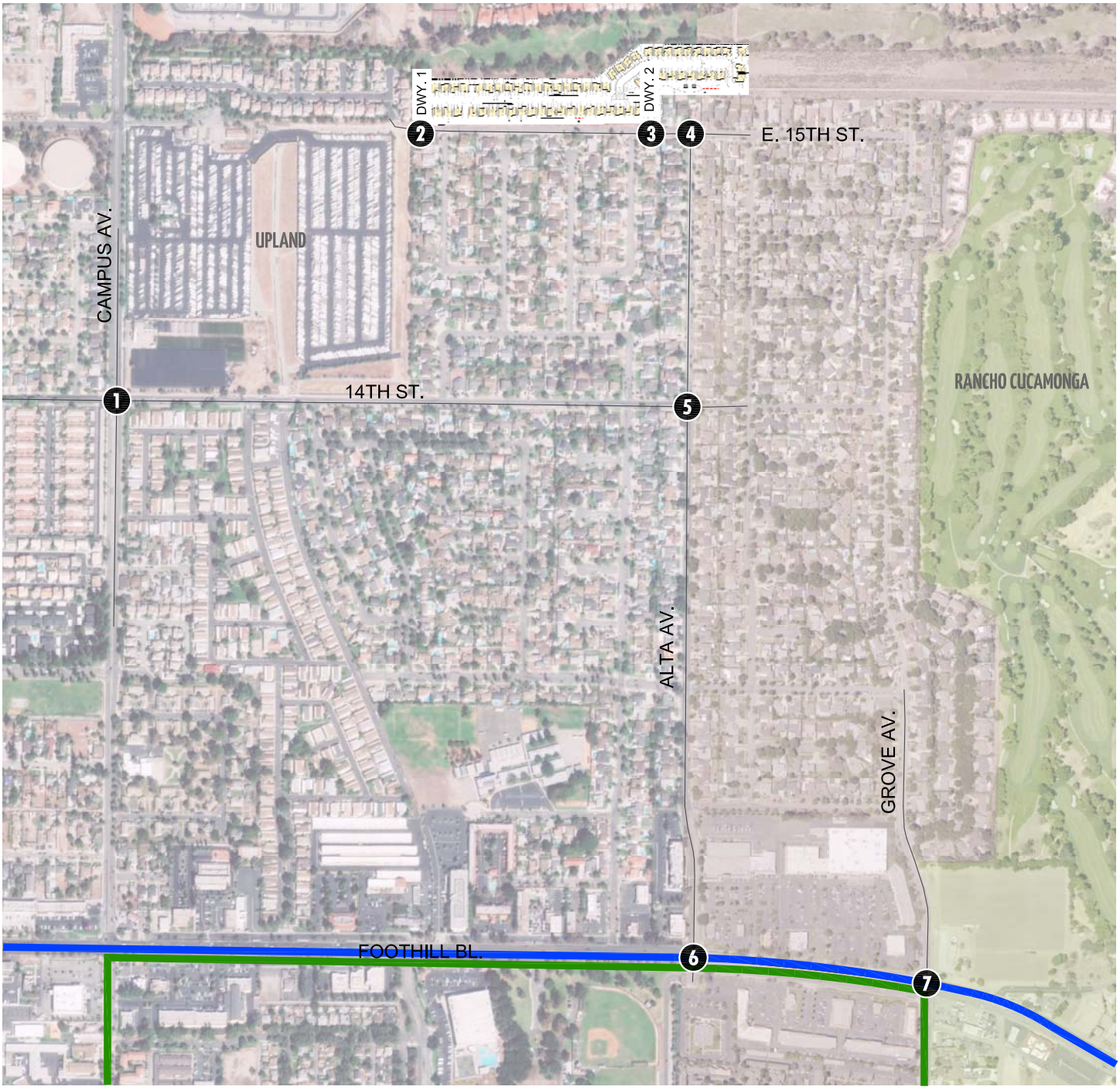

**LEGEND:**

- = SIDEWALK
- = BIKE LANE
- B = BUS STOP
- 0 = NO CROSSWALK
- 0 = FUTURE INTERSECTION
- 0 = CROSSWALK ON ALL APPROACHES
- 0 = CROSSWALK ON TWO APPROACHES

N

*11822 - peds.dwg*

## EXHIBIT 3-11: EXISTING TRANSIT ROUTES



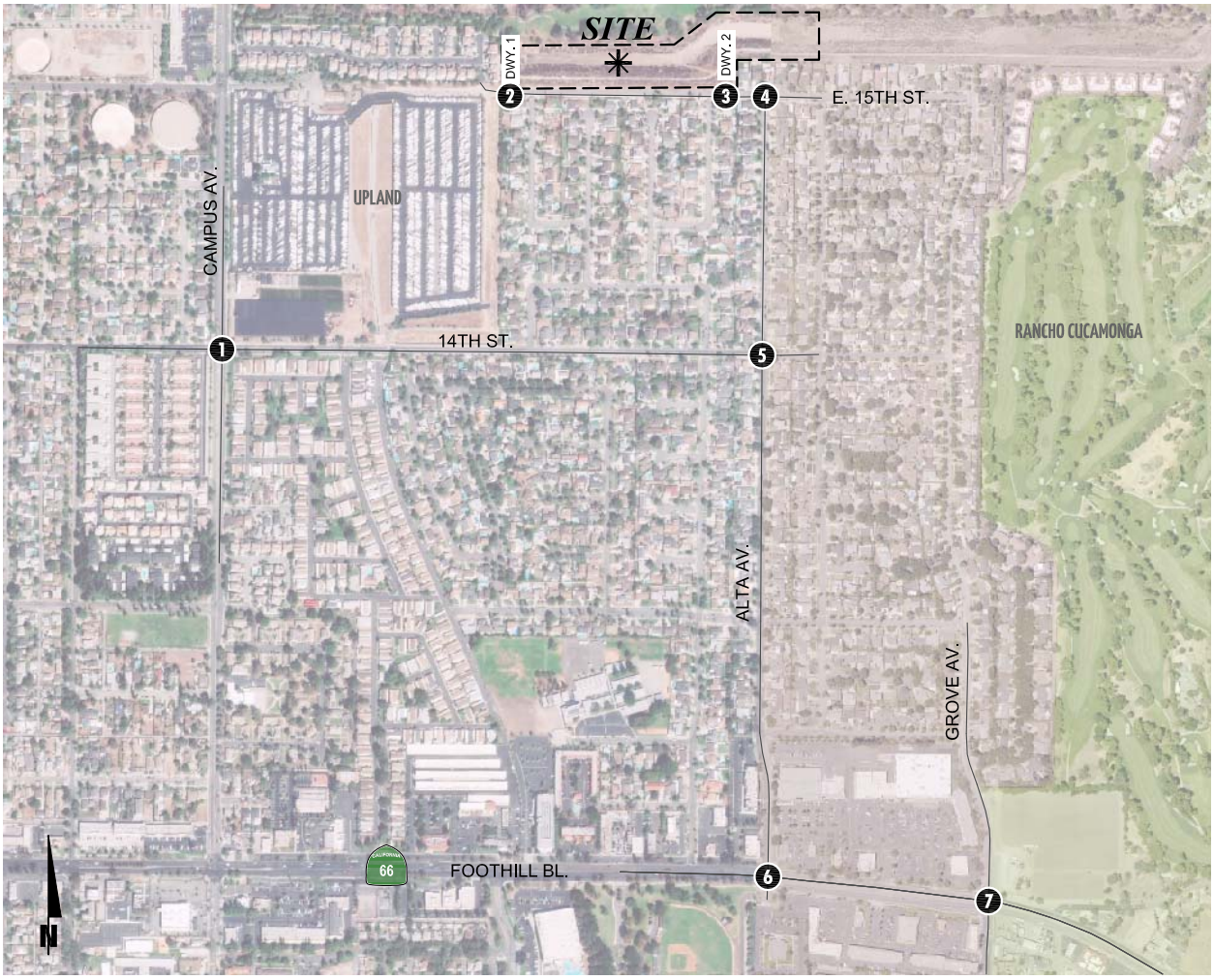

**LEGEND:**

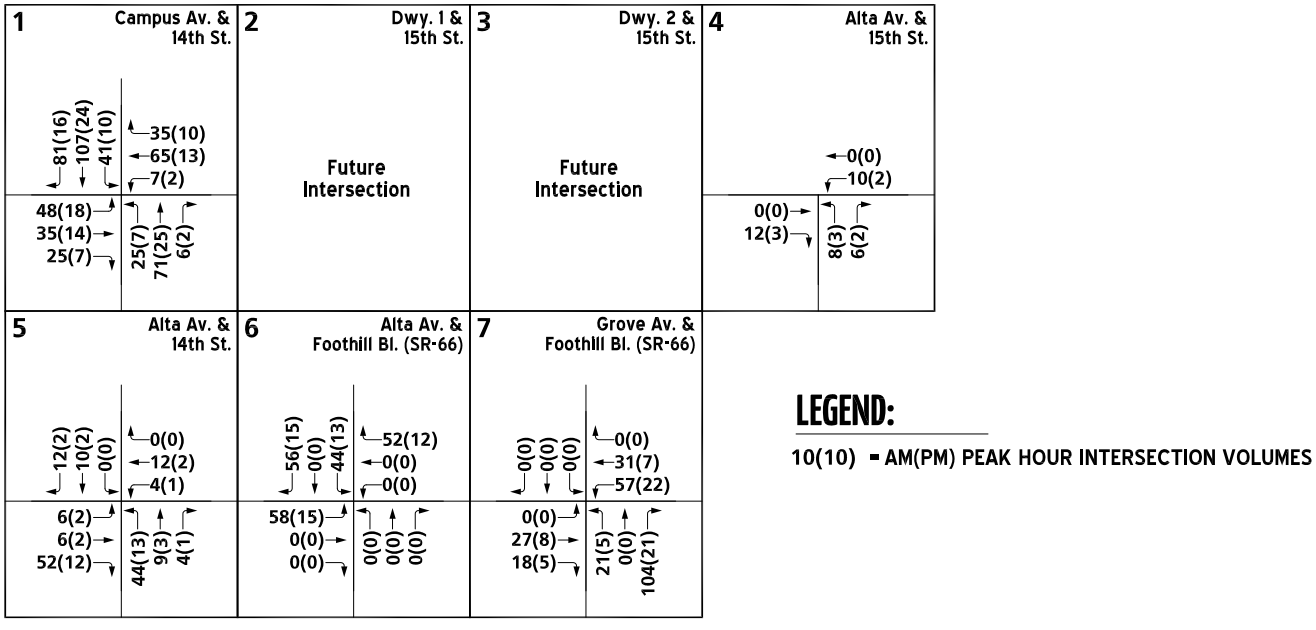
= OMNITRANS ROUTE 86

= OMNITRANS ROUTE 66

N

## EXHIBIT 3-12: SCHOOLS ONLY TRAFFIC VOLUMES




*11822 - vols.dwg*

School only traffic volumes were added to the count data collected in July 2018 to establish the existing baseline traffic volumes for the purposes of this analysis. Existing (2018) conditions represents the baseline traffic conditions as they existed at the time this report was prepared plus the local school traffic. Existing weekday AM and PM peak hour intersection volumes are shown on Exhibit 3-13.

## 3.6 EXISTING (2018) CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that all study area intersections are currently operating at an acceptable LOS.

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-14. The intersection operations analysis worksheets are included in Appendix 3.3 of this TIA.

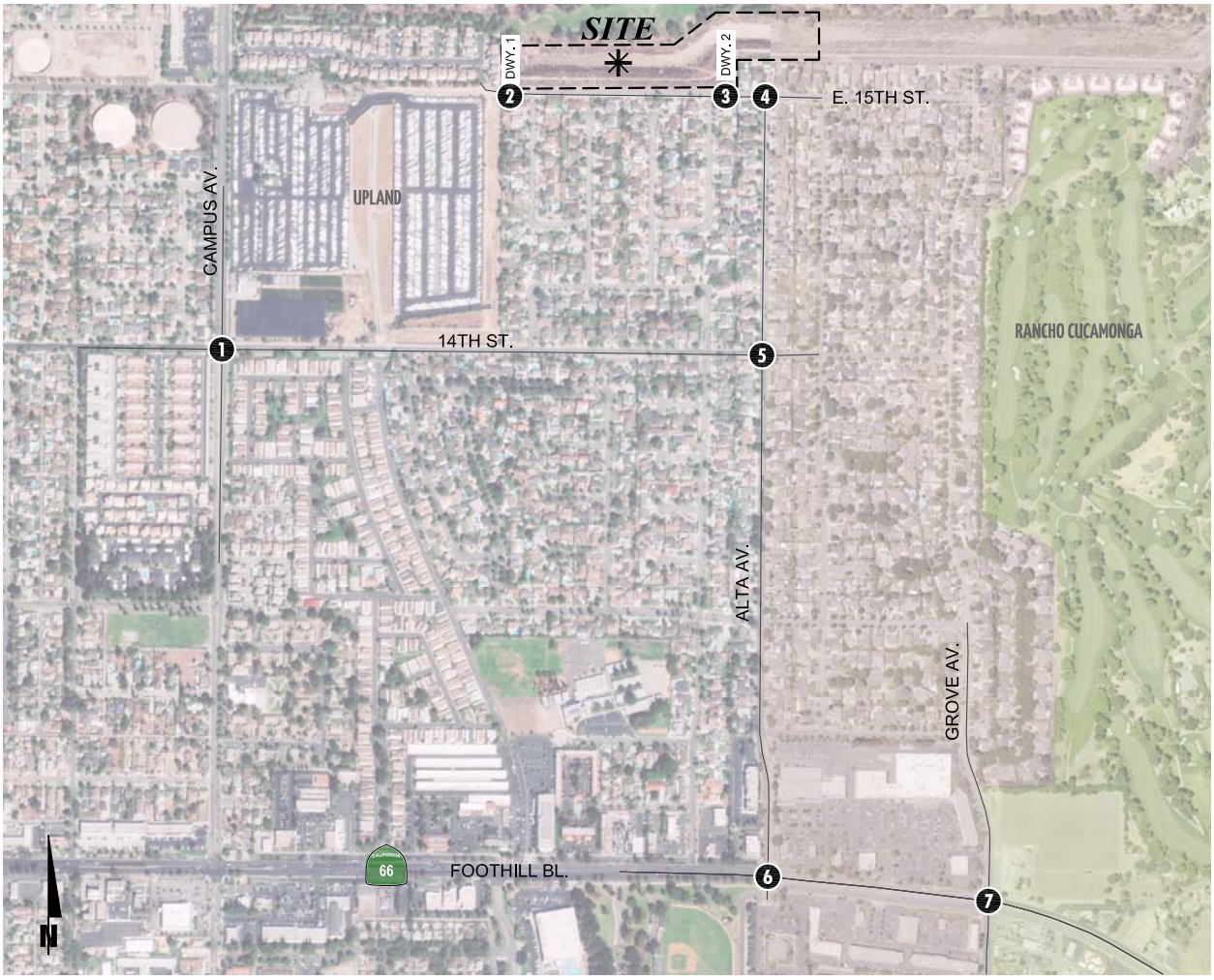
## 3.7 EXISTING (2018) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. There are currently no study area intersections that warrant a traffic signal. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.4.

## 3.8 RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at acceptable LOS (LOS B or better) for Existing (2018) traffic conditions. As such, no intersection improvements have been recommended.

## EXHIBIT 3-13: EXISTING (2018) TRAFFIC VOLUMES



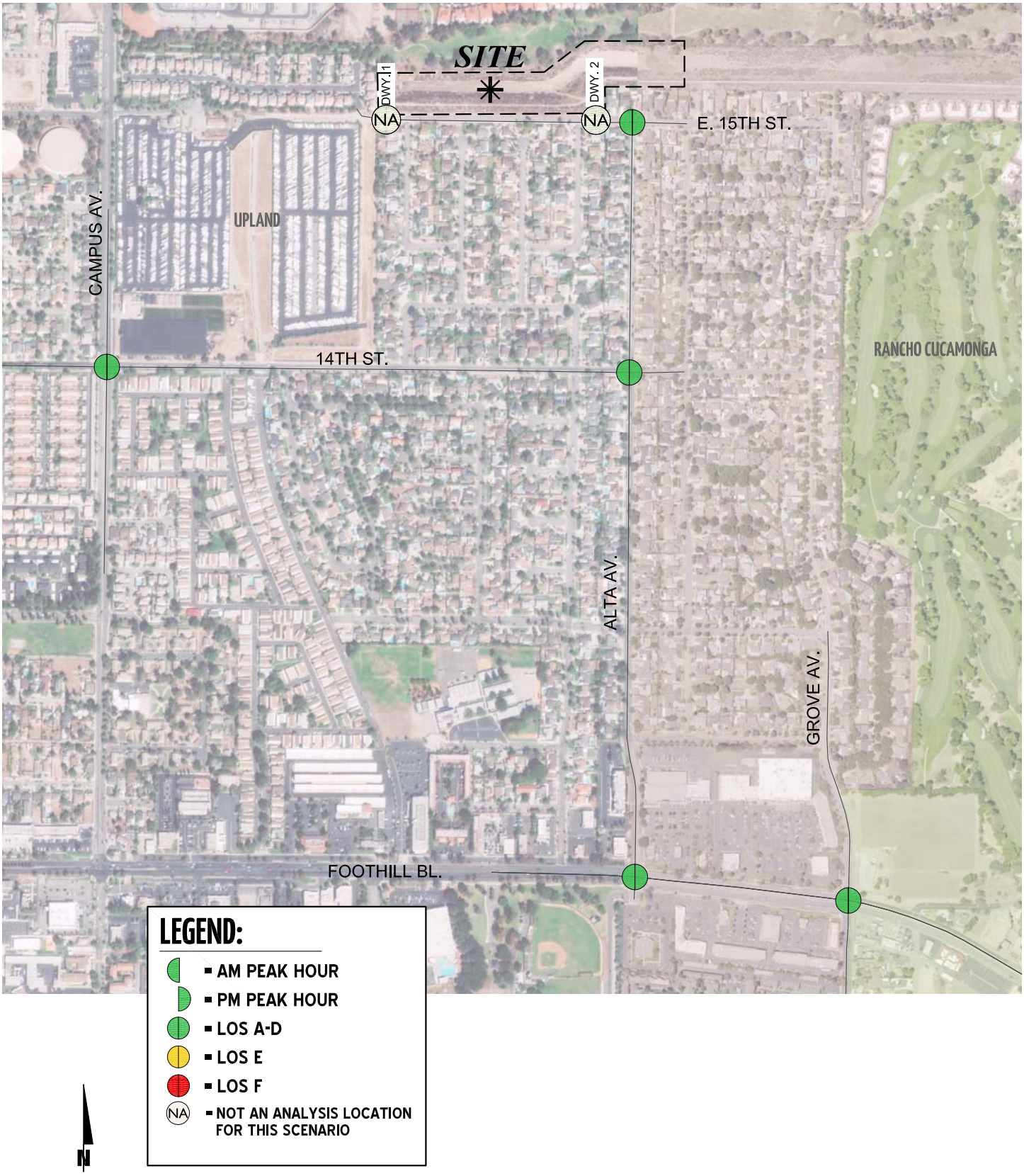

| 1 Campus Av. & 14th St. | 2 Dwy. 1 & 15th St. | 3 Dwy. 2 & 15th St. | 4 Alta Av. & 15th St. |
|---|---|---|---|
| 98(56), 588(535), 111(133) → 132(109), 129(73), 38(34) ← | Future Intersection | Future Intersection | 4(7), 18(7) ← |
| 73(93) → 65(121) → 40(20) → ; 32(25), 413(764), 25(51) ↑ | | | 3(6) → 14(3) → ; 9(7), 13(11) ↑ |

| 5 Alta Av. & 14th St. | 6 Alta Av. & Foothill Bl. (SR-66) | 7 Grove Av. & Foothill Bl. (SR-66) |
|---|---|---|
| 28(13), 11(3), 3(1) → 2(3), 90(101), 7(2) ← | 100(106), 8(11), 67(75) → 97(38), 731(838), 13(15) ← | 13(21), 80(134), 67(149) → 57(87), 696(708), 130(96) ← |
| 11(19) → 63(109) → 65(37) → ; 57(42), 12(10), 4(3) ↑ | 125(94) → 524(1319) → 20(18) → ; 11(13), 6(9), 5(18) ↑ | 12(24) → 398(1116) → 139(211) → ; 165(184), 69(156), 150(210) ↑ |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 3-14: EXISTING (2018) SUMMARY OF LOS




*11822 - los.dwg*

**Table 3-1**

**Intersection Analysis for Existing (2018) Conditions**

| # | Intersection | Traffic Control[3] | Intersection Approach Lanes[1] | | | | | | | | | | | | Delay[2] (secs.) | | Level of Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM | AM | PM |
| 1 | Campus Av. & 14th St. | TS | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 9.2 | 8.6 | A | A |
| 2 | Driveway 1 & 15th St. | | Future Intersection | | | | | | | | | | | | | | | |
| 3 | Driveway 2 & 15th St. | | Future Intersection | | | | | | | | | | | | | | | |
| 4 | Alta Av. & 15th St. | CSS | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 8.7 | 8.6 | A | A |
| 5 | Alta Av. & 14th St. | CSS | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 12.4 | 11.6 | B | B |
| 6 | Alta Av. & Foothill Bl. (SR-66) | TS | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | d | 1 | 2 | 0 | 13.8 | 14.1 | B | B |
| 7 | Grove Av. & Foothill Bl. (SR-66) | TS | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 14.8 | 18.6 | B | B |

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; d = Defacto Right-Turn Lane

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a

[3] TS = Traffic Signal; CSS = Cross-Street Stop

# 4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 66 single family detached residential dwelling units. For the purposes of this traffic study, the Project anticipated to be developed in a single phase with an anticipated opening year of 2020.

## 4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates used to estimate Project traffic are shown in Table 4-1. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual, 10th Edition, 2017. (2) For purposes of this analysis, ITE land use code 210 (Single Family Detached) is used to derive site specific trip generation estimates.

Trip generation rates are shown in Table 4-1 along with the Project trip generation summary. As shown in Table 4-1, the proposed Project is anticipated to generate a net total of 623 trip-ends per day with 50 AM peak hour trips and 65 PM peak hour trips.

## 4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Exhibit 4-1 illustrates the passenger car distribution patterns.

## 4.3 MODAL SPLIT

The potential for Project trips to be reduced by use of public transit, walking, or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

## 4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project peak hour intersection turning movement volumes are shown on Exhibit 4-2.

**Table 4-1**

**Project Trip Generation Summary**

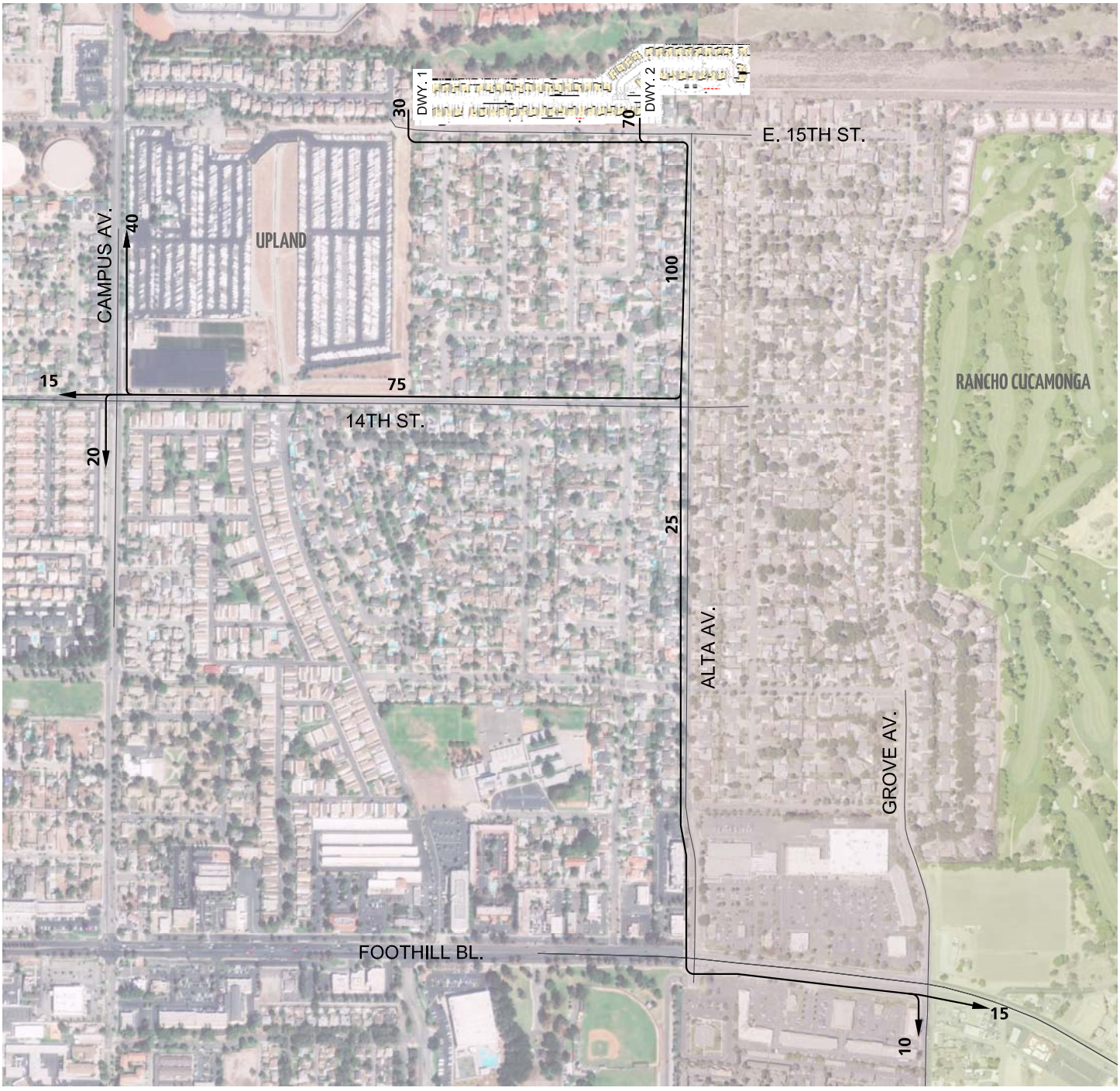
| Land Use[1] | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Rates** | | | | | | | | | |
| Single Family Residential Detached | 210 | DU | 0.19 | 0.56 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 |

| Project | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Summary** | | | | | | | | | |
| Upland Colonies | 66 | DU | 13 | 37 | 50 | 41 | 24 | 65 | 623 |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

## EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



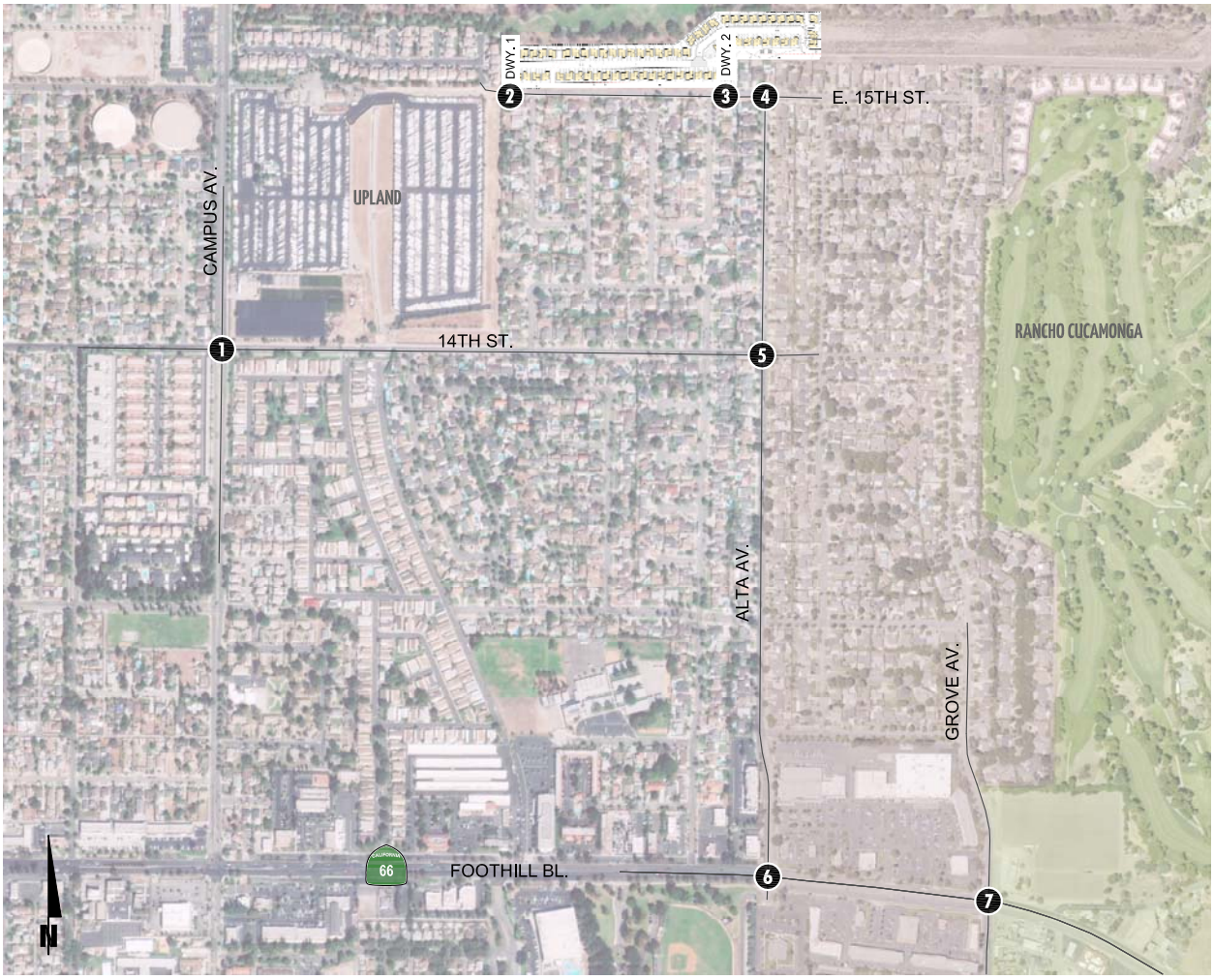

**LEGEND:**

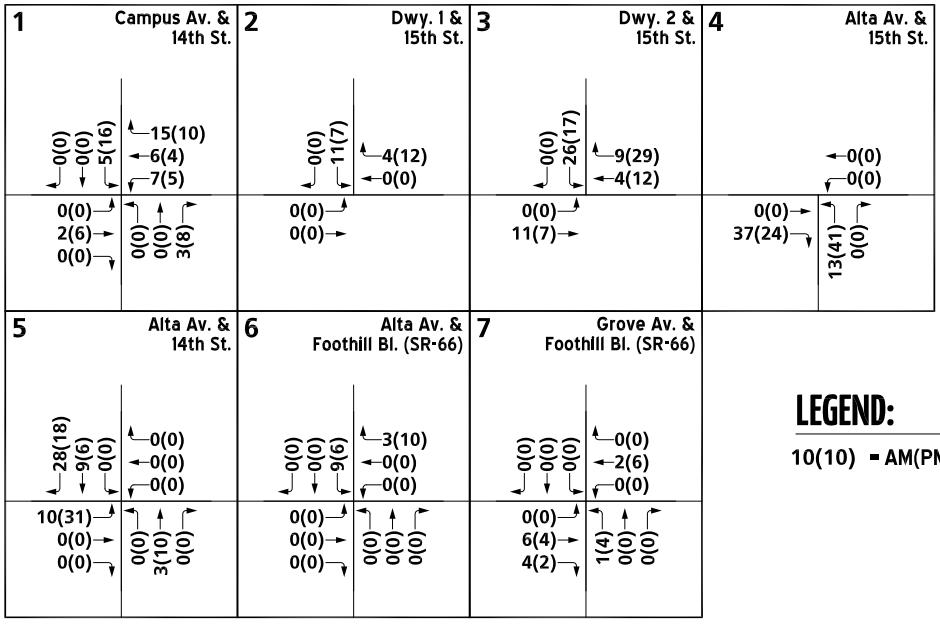
10 = PERCENT TO/FROM PROJECT

N

*11822 - trip.dwg*

## EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES




**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## 4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon a background (ambient) growth factor of 2.0% per year, compounded over 2 years. The ambient growth factor is intended to approximate traffic growth. The total ambient growth is 4.04% for 2020 traffic conditions. This ambient growth rate is added to existing (2018) traffic volumes to account for area-wide growth for Opening Year Cumulative (2020) traffic conditions.

## 4.6 CUMULATIVE DEVELOPMENT TRAFFIC

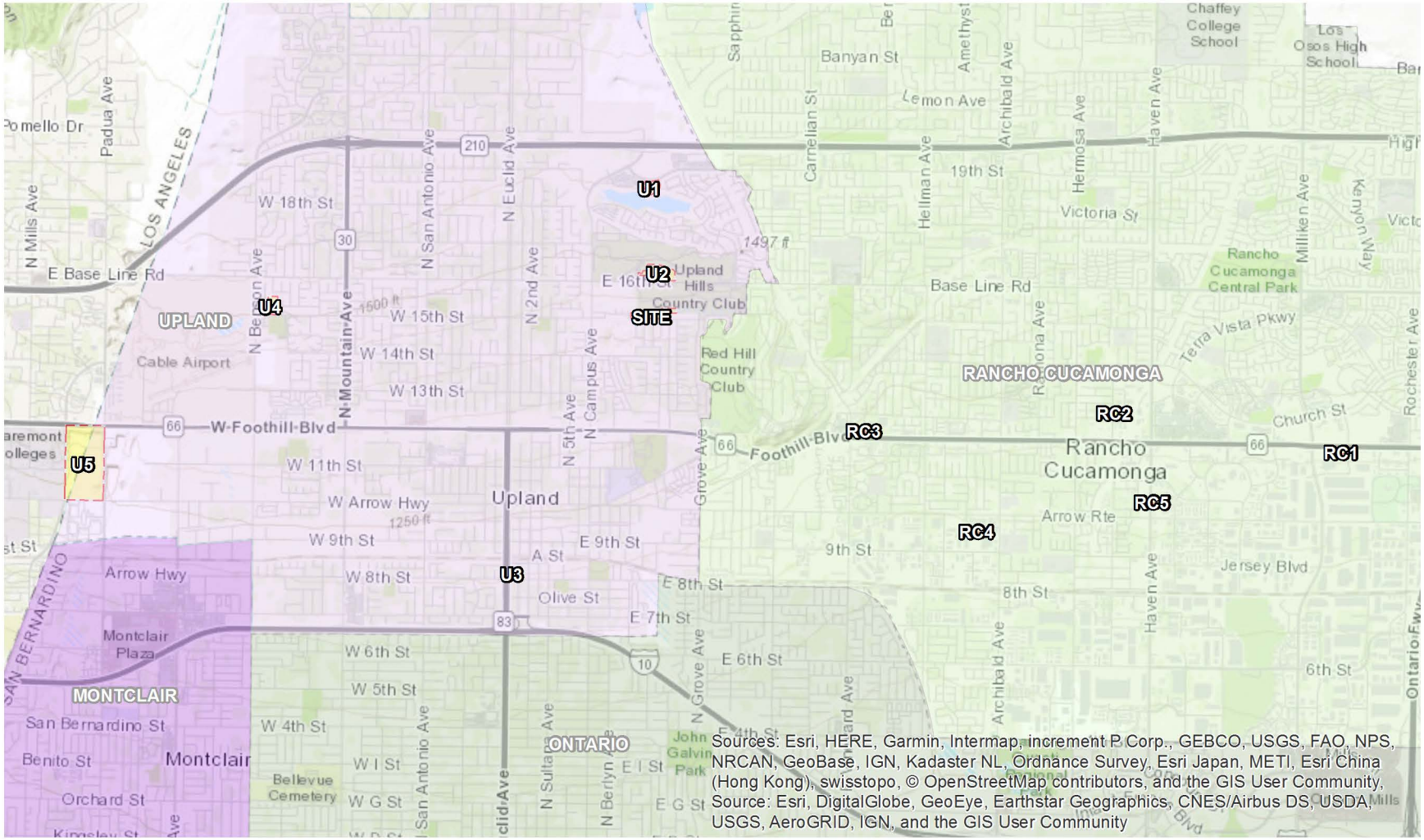
California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. Cumulative projects anticipated to contribute measurable traffic (i.e. 50 or more peak hour trips) to study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*.

Lastly, the cumulative projects list in this study is also consistent with other traffic studies for recently approved projects in the City of Upland. Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-2. If applicable, the traffic generated by cumulative projects was manually added to the Opening Year Cumulative (2020) forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-2 are reflected as part of the background traffic.

## 4.7 NEAR-TERM CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the Opening Year Cumulative (2020) traffic conditions. An ambient growth factor of 4.04% accounts for background (area-wide) traffic increases that occur over time up to the year 2020 from the year 2018. Project traffic is added to assess Opening Year Cumulative (2020) With Project traffic conditions. The 2020 roadway networks are similar to the Existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

## EXHIBIT 4-3: CUMULATIVE DEVELOPMENT LOCATION MAP




N





URBAN CROSSROADS

**Table 4-2**

**Cumulative Development Land Use Summary**

| ID | Project Name | Land Use[1] | Quantity | Units[2] |
|---|---|---|---|---|
| **City of Upland** | | | | |
| U1 | Colonies at San Antonio Specific Plan | Multifamily Housing | 263 | DU |
| U2 | Upland hills Country Club | SFDR | 68 | DU |
| U3 | Tierra Altas Apartments | Multifamily (Mid-rise) Housing | 61 | DU |
| U4 | Spanish Trails | SFDR | 39 | DU |
| U5 | Claremont University Consortium Athletic Fields | General Light Industrial | 652.018 | TSF |
| **City of Rancho Cucamonga** | | | | |
| RC1 | 11553 E. Foothill Boulevard | Private Gym | 4.724 | TSF |
| RC2 | 10319 Dorset Street | Employee Training Facility | 9.113 | TSF |
| RC3 | 8976 Foothill Boulevard | Restaurant | 2.750 | TSF |
| RC4 | 9581 Business Center Drive | Indoor Cycling Facility | 1.465 | TSF |
| RC5 | 8419 Haven Avenue | Fitness Studio | 2.276 | TSF |

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2020) Without Project
    - Existing 2018 volumes Plus School Traffic
    - Ambient growth traffic (4.04%)
    - Cumulative Only Traffic
- Opening Year Cumulative (2020) With Project
    - Existing 2018 volumes Plus School Traffic
    - Ambient growth traffic (4.04%)
    - Cumulative Only Traffic
    - Project Traffic

## 4.8 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) Without Project conditions were derived from the SCAG traffic model using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year peak hour forecasts were refined using the model derived long-range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data. The SCAG traffic model has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The future Horizon Year peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve reasonable growth for 2040 traffic conditions. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

The Project only traffic forecasts have been generated by applying the trip generation, distribution and traffic assignment calculations. Project traffic volumes were then added to the refined future year volumes to determine Horizon Year (2040) With Project traffic conditions. Flow conservation checks and forecast adjustments were performed as necessary to ensure that all future traffic volume forecasts are reasonable and to ensure the flow of traffic volumes between closely spaced intersections is maintained. In order words, traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

Post-processing worksheets for Horizon Year (2040) with Project traffic conditions are provided in Appendix 4.1.

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# 5 E+P TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations and traffic signal warrant analyses.

## 5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements along the Project's frontage and at driveways).

## 5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 shows the weekday peak hour volumes which can be expected for E+P traffic conditions.

## 5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1 and shown on Exhibit 5-2, which indicates there are no study area intersections anticipated to operate at unacceptable LOS for E+P conditions, consistent with Existing traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

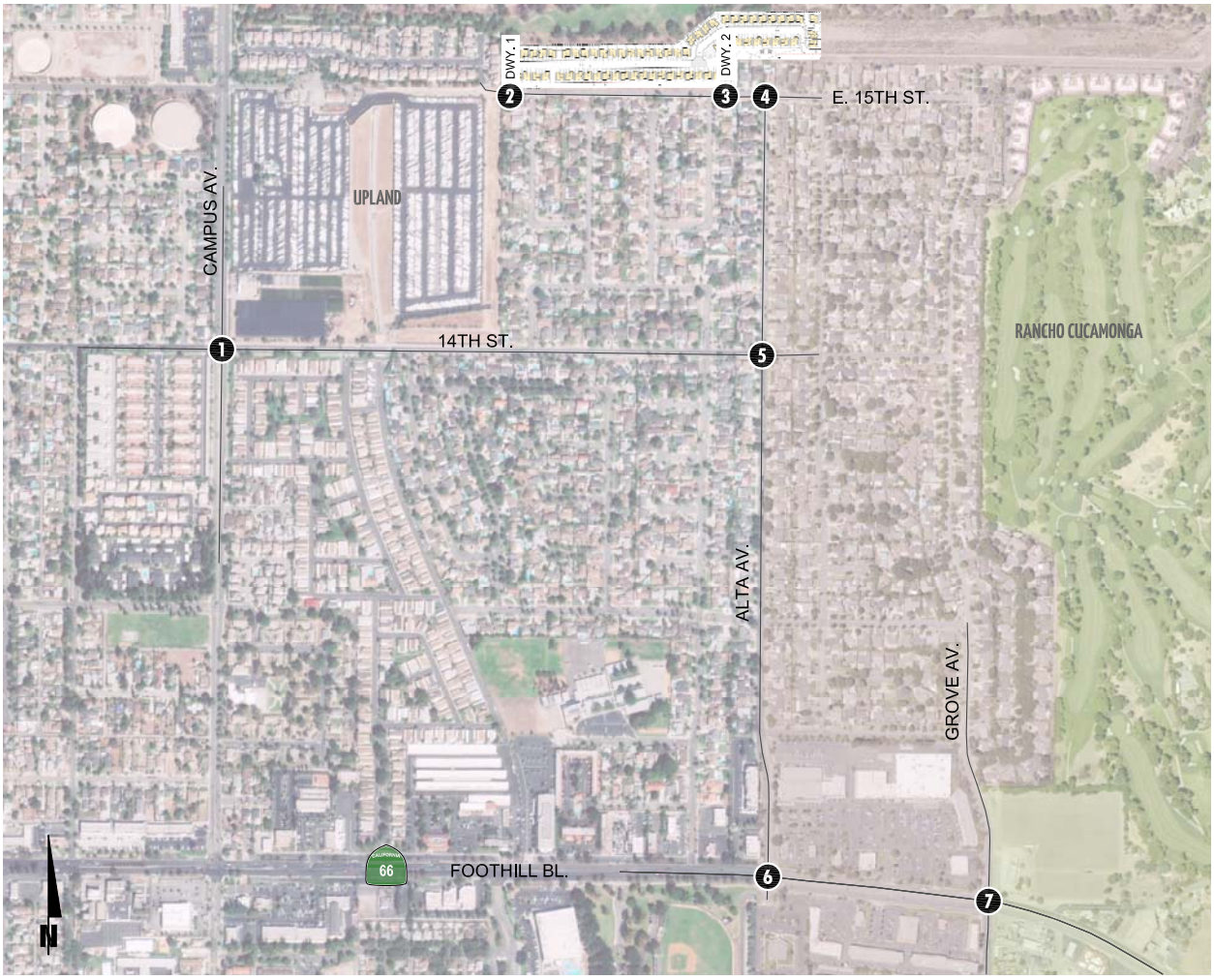
## 5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections anticipated to warrant a traffic signal for E+P traffic conditions. Worksheets for E+P traffic conditions signal warrants are provided in Appendices 5.2.

## 5.5 DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at acceptable LOS for E+P traffic conditions. As such, no intersection improvements have been recommended.

## EXHIBIT 5-1: E+P TRAFFIC VOLUMES




| 1 Campus Av. & 14th St. | 2 Dwy. 1 & 15th St. | 3 Dwy. 2 & 15th St. | 4 Alta Av. & 15th St. |
|---|---|---|---|
| 98(56) 588(535) 116(149) → 147(119) ← 135(77) ← 45(39)<br>73(93) → 67(127) → 40(20) → 32(25) 413(764) 28(59) ↑ | 0(0) 11(7) → 4(12) ← 3(7)<br>0(0) → 3(3) → | 0(0) 26(17) → 9(29) ← 17(26)<br>0(0) → 28(16) → | ← 4(7) ← 18(7)<br>3(6) → 51(27) → 22(48) 13(11) ↑ |

| 5 Alta Av. & 14th St. | 6 Alta Av. & Foothill Bl. (SR-66) | 7 Grove Av. & Foothill Bl. (SR-66) |
|---|---|---|
| 56(31) 20(9) 3(1) → 2(3) ← 90(101) ← 7(2)<br>21(50) → 63(109) → 65(37) → 57(42) 15(20) 4(3) ↑ | 100(106) 8(11) 76(81) → 100(48) ← 731(838) ← 13(15)<br>125(94) → 524(1319) → 20(18) → 11(13) 6(9) 5(18) ↑ | 13(21) 80(134) 67(149) → 57(87) ← 698(714) ← 130(96)<br>12(24) → 404(1120) → 143(213) → 166(188) 69(156) 150(210) ↑ |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 5-2: E+P SUMMARY OF LOS

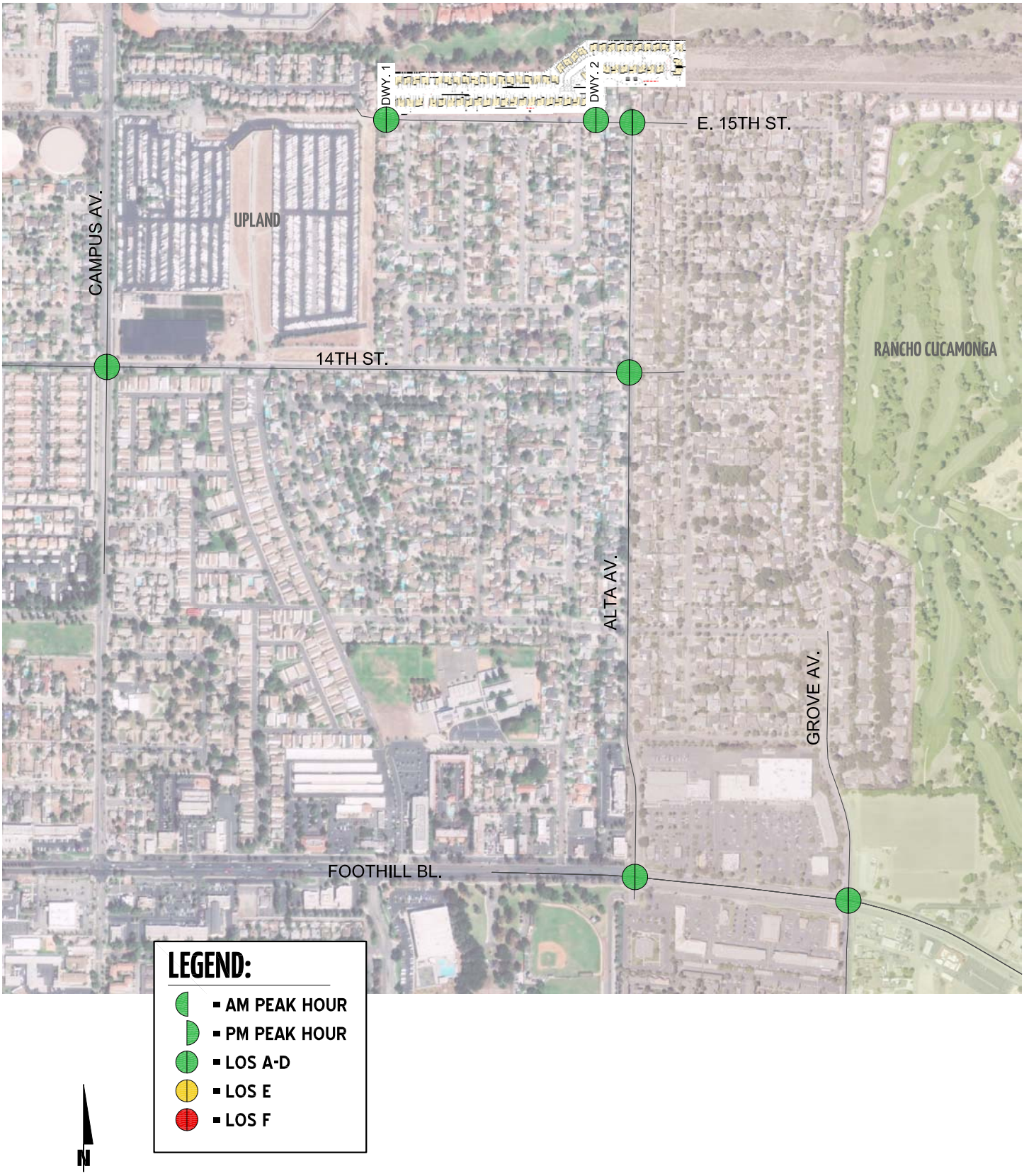


**Table 5-1**

**Intersection Analysis for E+P Conditions**

| # | Intersection | Traffic Control[2] | Existing (2018) | | | | E+P | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[1] (secs.) | | Level of Service | | Delay[1] (secs.) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Campus Av. & 14th St. | TS | 9.2 | 8.6 | A | A | 9.3 | 8.7 | A | A |
| 2 | Driveway 1 & 15th St. | **CSS** | Future Intersection | | | | 8.6 | 8.6 | A | A |
| 3 | Driveway 2 & 15th St. | **CSS** | Future Intersection | | | | 8.9 | 8.9 | A | A |
| 4 | Alta Av. & 15th St. | CSS | 8.7 | 8.6 | A | A | 9.1 | 9.0 | A | A |
| 5 | Alta Av. & 14th St. | CSS | 12.4 | 11.6 | B | B | 13.6 | 13.2 | B | B |
| 6 | Alta Av. & Foothill Bl. (SR-66) | TS | 13.8 | 14.1 | B | B | 13.9 | 14.2 | B | B |
| 7 | Grove Av. & Foothill Bl. (SR-66) | TS | 14.8 | 18.6 | B | B | 14.8 | 18.6 | B | B |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] TS = Traffic Signal; CSS = Cross-Street Stop; **CSS** = Improvement

# 6 OPENING YEAR CUMULATIVE (2020) TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Opening Year Cumulative (2020) conditions and the resulting intersection operations and traffic signal warrant analyses.

## 6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2020) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and at driveways).

## 6.2 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT VOLUME FORECASTS

To account for background traffic, other known cumulative development projects in the study area were included in addition to 4.04% of ambient growth for Opening Year Cumulative (2020) Without Project traffic conditions. The weekday AM and PM peak hour volumes for Opening Year Cumulative (2020) Without Project traffic conditions are shown on Exhibit 6-1.

## 6.3 OPENING YEAR CUMULATIVE (2020) WITH PROJECT VOLUME FORECASTS

The Opening Year Cumulative (2020) With Project scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% and the addition of Project traffic. The weekday AM and PM peak hour volumes for Opening Year Cumulative (2020) With Project traffic conditions are shown on Exhibit 6-2.

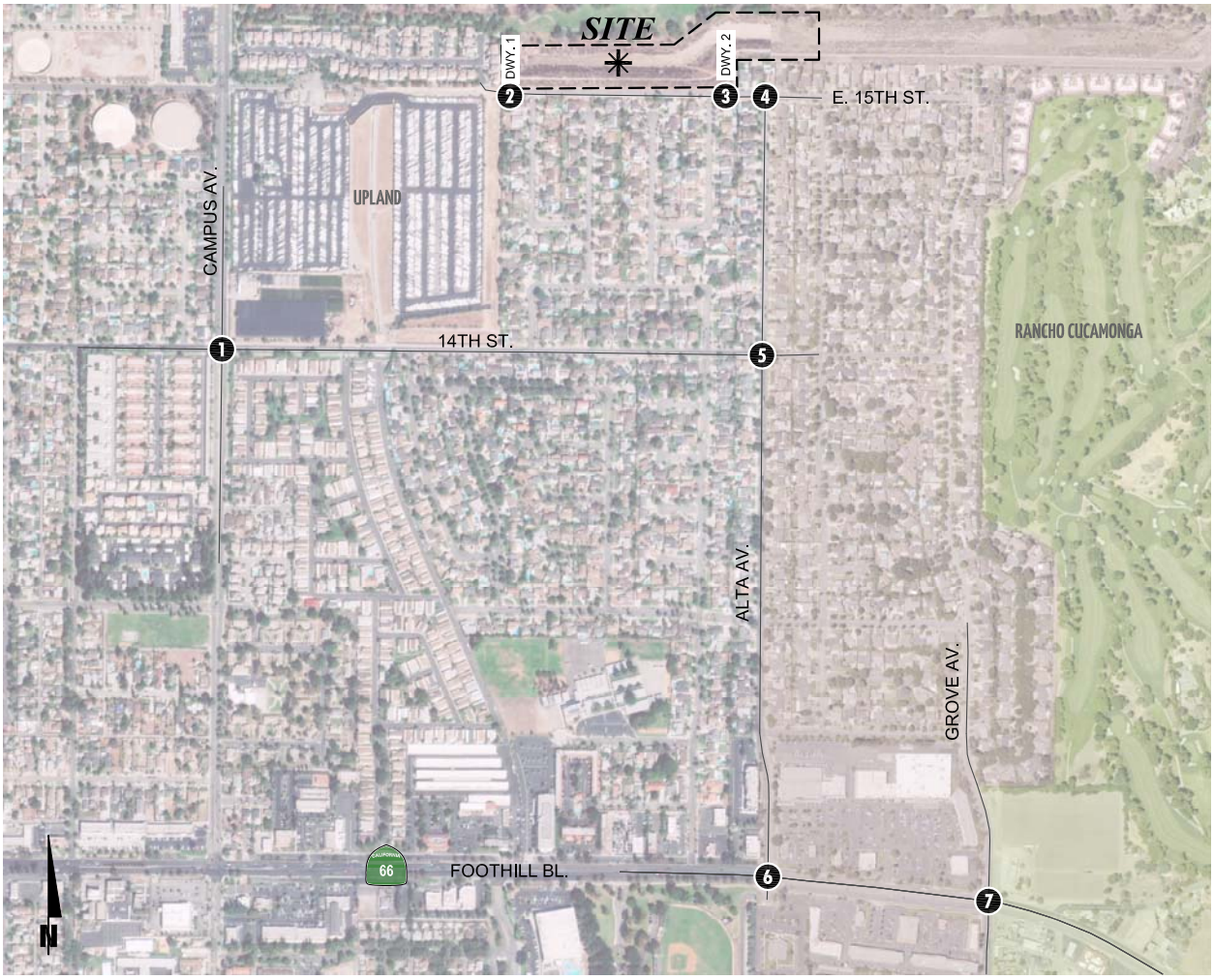
## 6.4 INTERSECTION OPERATIONS ANALYSIS

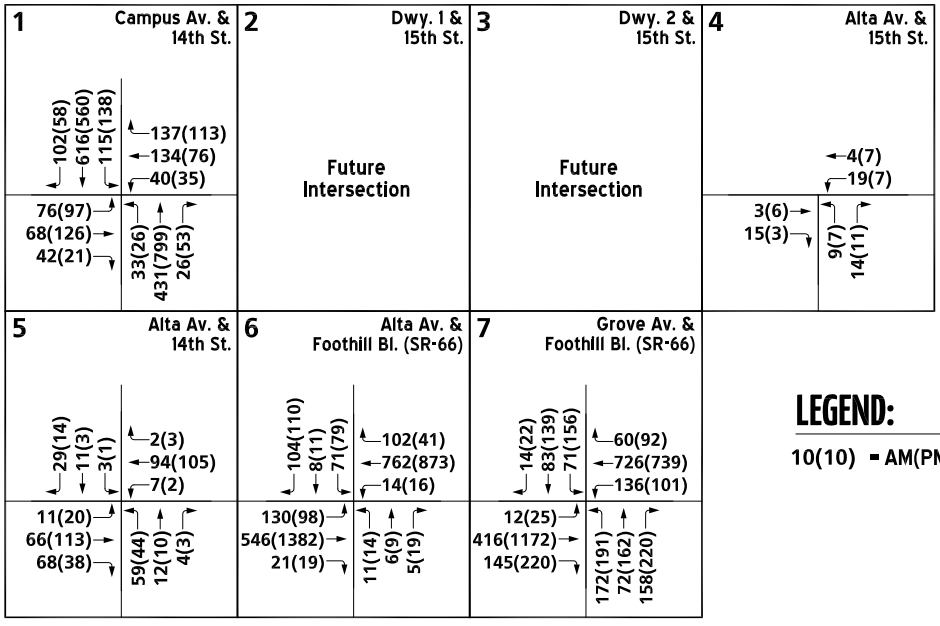
Opening Year Cumulative (2020) Without and With Project peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 6-1 for both Opening Year Cumulative (2020) Without and With Project traffic conditions.

### 6.4.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS

All of the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2020) Without Project conditions. Consistent with Table 6-1, a summary of the peak hour intersection LOS for Opening Year Cumulative (2020) Without Project conditions are shown on Exhibit 6-3. The intersection operations analysis worksheets for Opening Year Cumulative (2020) Without Project traffic conditions are included in Appendix 6.1 of this TIA.

## EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES

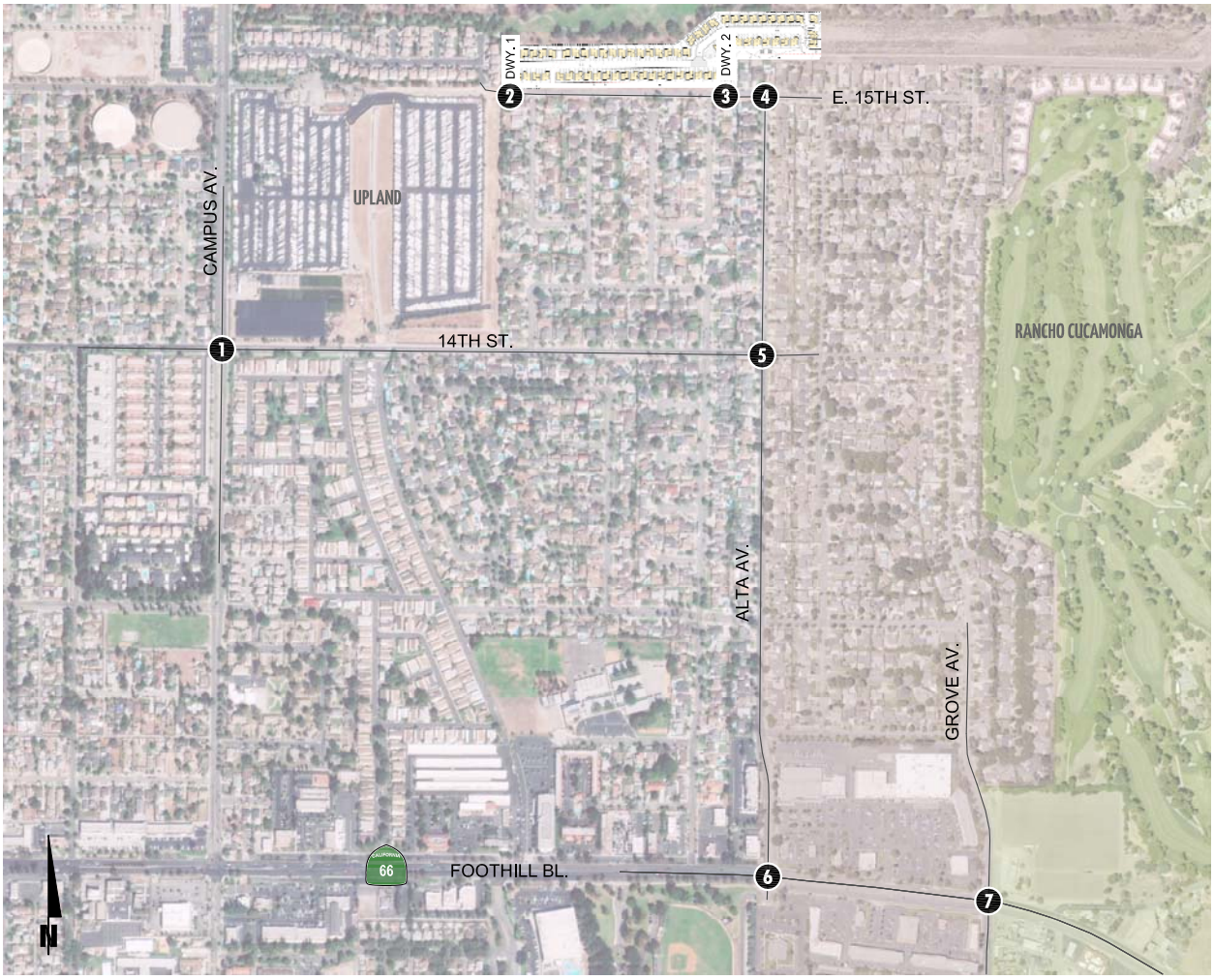



**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES




| 1 Campus Av. & 14th St. | 2 Dwy. 1 & 15th St. | 3 Dwy. 2 & 15th St. | 4 Alta Av. & 15th St. |
|---|---|---|---|
| 102(58) 616(560) 120(154) → 152(123) ← 140(80) ← 47(40) | 0(0) 11(7) → 4(12) ← 3(7) | 0(0) 26(17) → 9(29) ← 18(27) | ← 4(7) ← 19(7) |
| 76(97) → 70(132) → 42(21) → 33(26) 431(799) 29(61) | 0(0) → 3(3) → | 0(0) → 29(16) → | 3(6) → 52(27) → 22(48) 14(11) |

| 5 Alta Av. & 14th St. | 6 Alta Av. & Foothill Bl. (SR-66) | 7 Grove Av. & Foothill Bl. (SR-66) |
|---|---|---|
| 57(32) 20(9) 3(1) → 2(3) ← 94(105) ← 7(2) | 104(110) 8(11) 80(85) → 105(51) ← 762(873) ← 14(16) | 14(22) 83(139) 71(156) → 60(92) ← 728(745) ← 136(101) |
| 21(51) → 66(113) → 68(38) → 59(44) 15(20) 4(3) | 130(98) → 546(1382) → 21(19) → 11(14) 6(9) 5(19) | 12(25) → 422(1176) → 149(222) → 173(195) 72(162) 158(220) |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT SUMMARY OF LOS

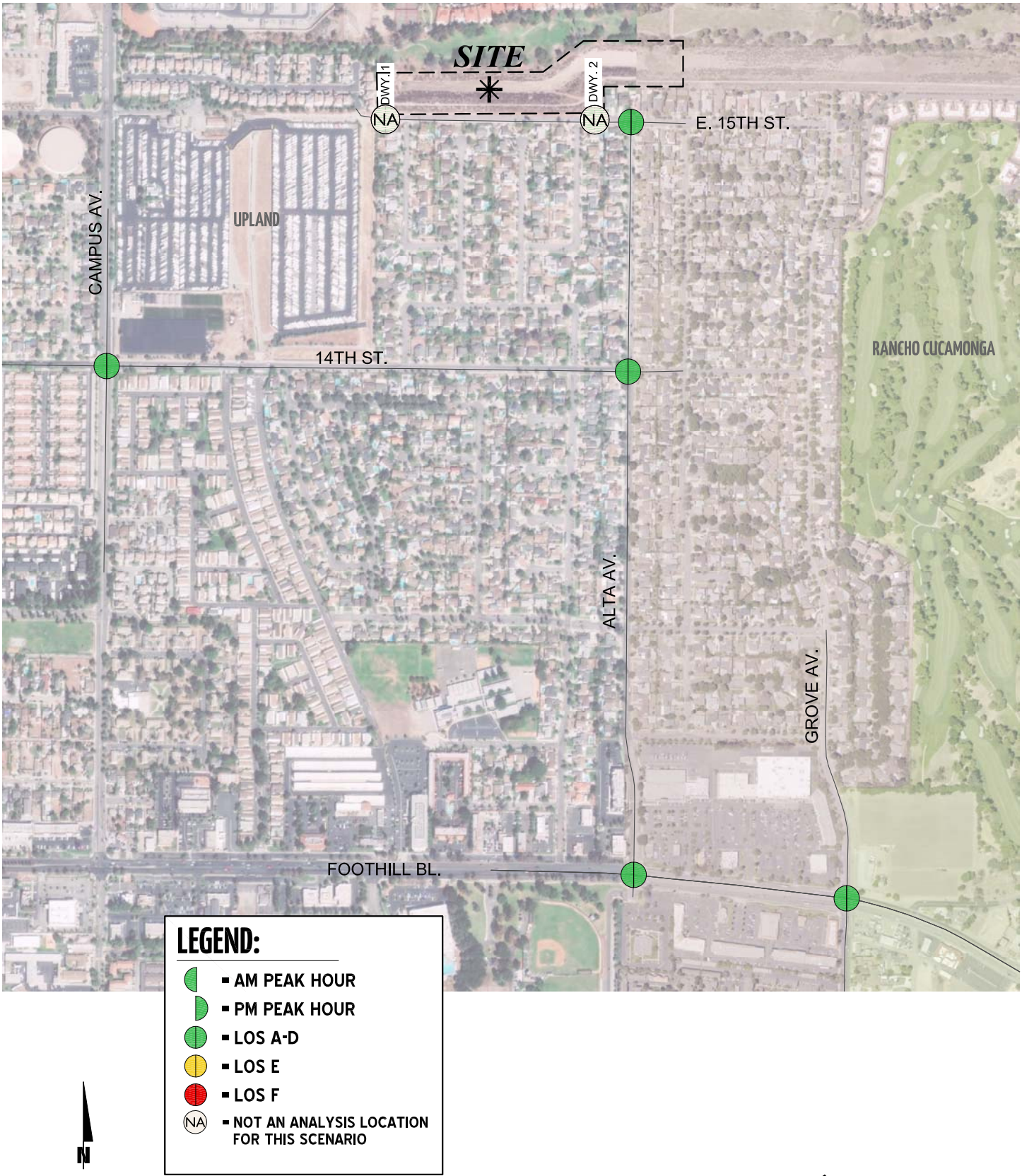



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**Table 6-1**

**Intersection Analysis for Opening Year Cumulative (2020) Conditions**

| # | Intersection | Traffic Control[2] | 2020 Without Project | | | | 2020 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[1] (secs.) | | Level of Service | | Delay[1] (secs.) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Campus Av. & 14th St. | TS | 9.3 | 8.7 | A | A | 9.7 | 8.9 | A | A |
| 2 | Driveway 1 & 15th St. | **CSS** | Future Intersection | | | | 8.6 | 8.9 | A | A |
| 3 | Driveway 2 & 15th St. | **CSS** | Future Intersection | | | | 8.9 | 8.9 | A | A |
| 4 | Alta Av. & 15th St. | CSS | 8.7 | 8.6 | A | A | 9.1 | 9.0 | A | A |
| 5 | Alta Av. & 14th St. | CSS | 12.6 | 11.8 | B | B | 13.9 | 13.4 | B | B |
| 6 | Alta Av. & Foothill Bl. (SR-66) | TS | 14.2 | 14.6 | B | B | 14.3 | 14.6 | B | B |
| 7 | Grove Av. & Foothill Bl. (SR-66) | TS | 15.0 | 20.1 | B | C | 15.0 | 20.1 | B | C |

**BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] TS = Traffic Signal; CSS = Cross-Street Stop; **CSS** = Improvement

### 6.4.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS

Similarly, the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2020) With Project conditions. Consistent with Table 6-1, a summary of the peak hour intersection LOS for Opening Year Cumulative (2020) With Project conditions are shown on Exhibit 6-4. The intersection operations analysis worksheets for Opening Year Cumulative (2020) With Project traffic conditions are included in Appendix 6.2 of this TIA.

## 6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections anticipated to meet traffic signal warrants for Opening Year Cumulative (2020) Without and With Project traffic conditions. Worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions signal warrants are provided in Appendices 6.3 and 6.4, respectively.

## 6.6 PEAK HOUR QUEUING ANALYSIS

At the request of City staff, a queuing analysis for the intersection of Campus Avenue and 14$^{th}$ Street in order to determine if the left turn pocket storage is sufficient for all approaches and whether the current traffic signal phasing should be modified (currently permissive phasing). As demonstrated from the peak hour operations (see Section 6.4 of this report), the intersection of Campus Avenue and 14$^{th}$ Street is anticipated to operate at an acceptable LOS with the existing signal phasing. As such, no modifications have been recommended.

Table 6-2 summarizes the 95$^{th}$ percentile queues for the left turn lanes at Campus Avenue and 14$^{th}$ Street. As shown in Table 6-2, all of 95$^{th}$ percentile queues can be accommodated within the existing storage, with the exception of the southbound left turn lane during the PM peak hour only. Although the 95$^{th}$ percentile queue is anticipated to exceed the available storage for the turn lane, there is sufficient storage within the striped median for vehicles to continue to stack without blocking the adjacent through lane. As such, no restriping is recommended. Worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions queuing analyses are provided in Appendices 6.5 and 6.6, respectively.

## 6.7 DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at acceptable LOS for Opening Year Cumulative (2020) Without and With Project traffic conditions. As such, no intersection improvements have been recommended.

## EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2020) WITH PROJECT SUMMARY OF LOS




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**Table 6-2**

**Peak Hour Queuing Summary for Opening Year Cumulative (2020) Conditions**

| Intersection | Movement[4] | Available Stacking Distance (Feet) | 2020 Without Project | | | | 2020 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet) | | Acceptable?[1] | | 95th Percentile Queue (Feet) | | Acceptable?[1] | |
| | | | AM Peak Hour | PM Peak Hour | AM | PM | AM Peak Hour | PM Peak Hour | AM | PM |
| Campus Av. & 14th St. | NBL | 100 | 24 | 19 | Yes | Yes | 23 | 19 | Yes | Yes |
| | SBL | 100 | 66 | 120 | Yes | Yes[2] | 66 | 142 | Yes | Yes[2] |
| | EBL | 60 | 44 | 53 | Yes | Yes | 44 | 54 | Yes | Yes |
| | WBL | 80 | 25 | 24 | Yes | Yes | 28 | 26 | Yes | Yes |

* **BOLD** = Queue length exceeds available stacking distance.

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, however, there is sufficient storage within the striped median for vehicles to continue to stack without blocking the adjacent through lane. As such, no restriping is recommended.

# 7 HORIZON YEAR (2040) TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Horizon Year (2040) conditions and the resulting intersection operations and traffic signal warrant analyses.

## 7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and at driveways).

## 7.2 HORIZON YEAR (2040) WITHOUT PROJECT VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SCAG traffic model (see Section 4.8 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). The weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-1.

## 7.3 HORIZON YEAR (2040) WITH PROJECT VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SCAG traffic model, plus the traffic generated by the proposed Project (see Section 4.8 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). The weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-2.

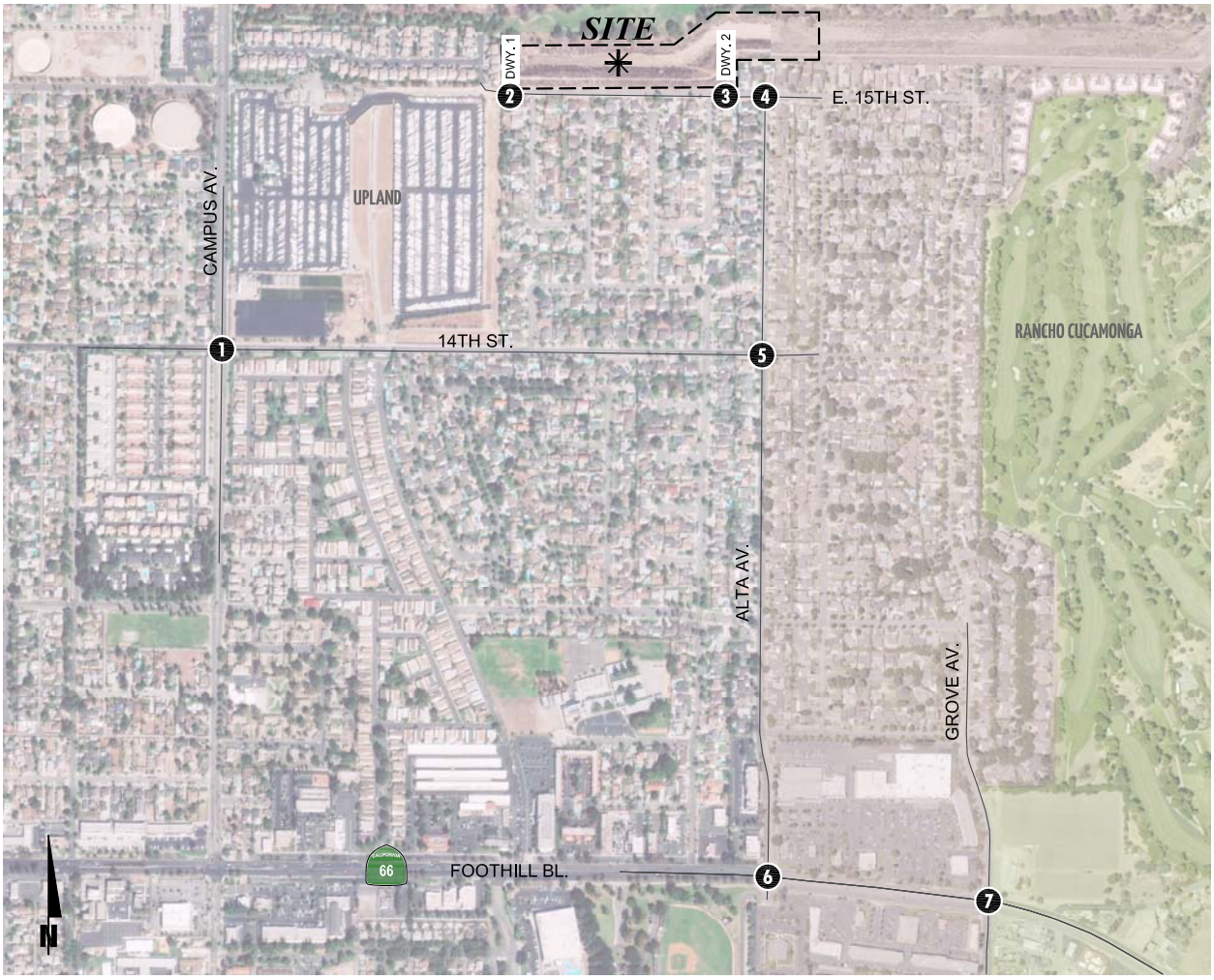
## 7.4 INTERSECTION OPERATIONS ANALYSIS

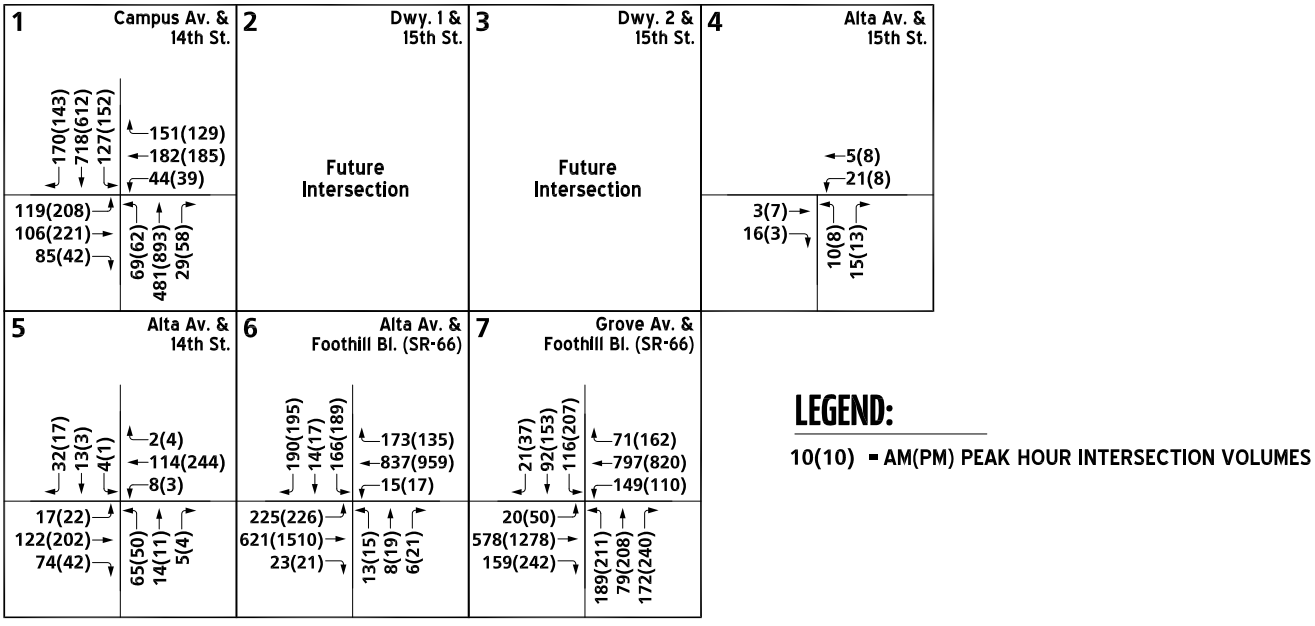
Horizon Year (2040) Without and With Project peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 7-1 for both Horizon Year (2040) Without and With Project traffic conditions.

### 7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS

All of the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under Horizon Year (2040) Without Project conditions. Consistent with Table 7-1, a summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions are shown on Exhibit 7-3. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendix 7.1 of this TIA.

## EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES

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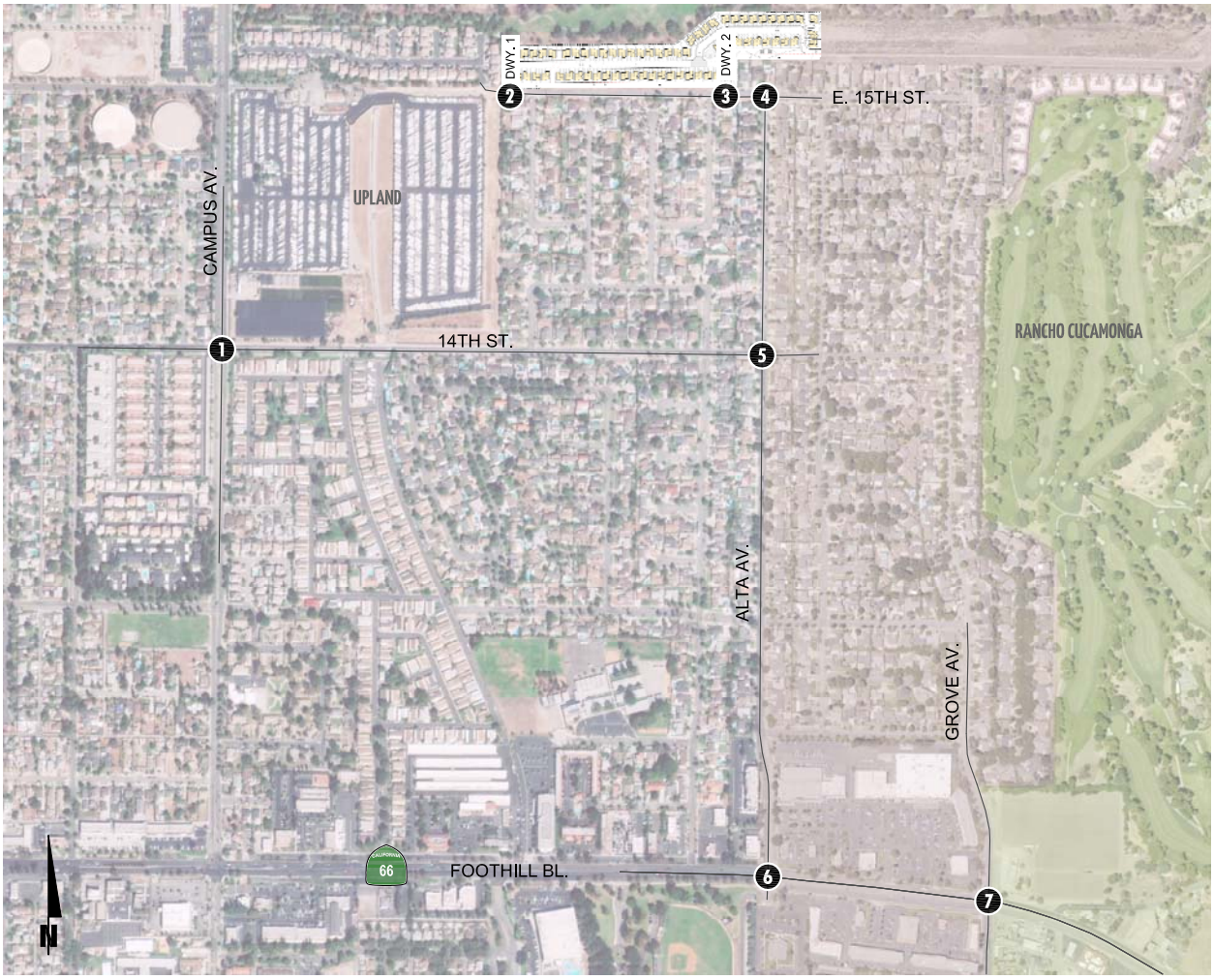
## EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES




| 1 Campus Av. & 14th St. | 2 Dwy. 1 & 15th St. | 3 Dwy. 2 & 15th St. | 4 Alta Av. & 15th St. |
|---|---|---|---|
| 170(143) 718(612) 132(168) → 166(139) ← 188(189) ← 51(44) | 0(0) 11(7) → 4(12) ← 3(8) | 0(0) 26(17) → 9(29) ← 19(28) | ← 5(8) ← 21(8) |
| 119(208) → 108(227) → 85(42) → | 0(0) → 3(3) → | 0(0) → 30(17) → | 3(7) → 53(27) → |
| 69(62) 481(893) 32(66) | | | 23(49) 15(13) |

| 5 Alta Av. & 14th St. | 6 Alta Av. & Foothill Bl. (SR-66) | 7 Grove Av. & Foothill Bl. (SR-66) |
|---|---|---|
| 60(35) 22(9) 4(1) → 2(4) ← 114(244) ← 8(3) | 190(195) 14(17) 175(195) → 176(145) ← 837(959) ← 15(17) | 21(37) 92(153) 116(207) → 71(162) ← 799(826) ← 149(110) |
| 27(53) → 122(202) → 74(42) → | 225(226) → 621(1510) → 23(21) → | 20(50) → 584(1282) → 163(244) → |
| 65(50) 17(21) 5(4) | 13(15) 8(19) 6(21) | 190(215) 79(208) 172(240) |

**LEGEND:**

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

## EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS




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**Table 7-1**

**Intersection Analysis for Opening Year Cumulative (2040) Conditions**

| # | Intersection | Traffic Control[2] | 2040 Without Project | | | | 2040 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay[1] (secs.) | | Level of Service | | Delay[1] (secs.) | | Level of Service | |
| | | | AM | PM | AM | PM | AM | PM | AM | PM |
| 1 | Campus Av. & 14th St. | TS | 12.7 | 14.6 | B | B | 13.2 | 15.4 | B | B |
| 2 | Driveway 1 & 15th St. | **CSS** | Future Intersection | | | | 8.6 | 8.6 | A | A |
| 3 | Driveway 2 & 15th St. | **CSS** | Future Intersection | | | | 8.9 | 8.9 | A | A |
| 4 | Alta Av. & 15th St. | CSS | 8.8 | 8.6 | A | A | 9.1 | 9.0 | A | A |
| 5 | Alta Av. & 14th St. | CSS | 15.0 | 16.3 | C | C | 16.9 | 19.8 | C | C |
| 6 | Alta Av. & Foothill Bl. (SR-66) | TS | 23.6 | 25.9 | C | C | 24.4 | 26.4 | C | C |
| 7 | Grove Av. & Foothill Bl. (SR-66) | TS | 16.0 | 29.0 | B | C | 16.0 | 29.1 | B | C |

**BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] TS = Traffic Signal; CSS = Cross-Street Stop; **CSS** = Improvement

### 7.4.2 HORIZON YEAR (2040) WITH PROJECT CONDITIONS

Similarly, the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Horizon Year (2040) With Project conditions. Consistent with Table 7-1, a summary of the peak hour intersection LOS for Horizon Year (2040) With Project conditions are shown on Exhibit 7-4. The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TIA.

## 7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections anticipated to meet traffic signal warrants for Horizon Year (2040) Without and With Project traffic conditions. Worksheets for Horizon Year (2040) Without and With Project traffic conditions signal warrants are provided in Appendices 7.3 and 7.4, respectively.

## 7.6 PEAK HOUR QUEUING ANALYSIS

At the request of City staff, a queuing analysis for the intersection of Campus Avenue and 14th Street in order to determine if the left turn pocket storage is sufficient for all approaches and whether the current traffic signal phasing should be modified (currently permissive phasing). As demonstrated from the peak hour operations (see Section 7.4 of this report), the intersection of Campus Avenue and 14th Street is anticipated to operate at an acceptable LOS with the existing signal phasing. As such, no modifications have been recommended.

Table 7-2 summarizes the 95th percentile queues for the left turn lanes at Campus Avenue and 14th Street. As shown in Table 7-2, all of 95th percentile queues can be accommodated within the existing storage, with the exception of the southbound left turn lane (during the PM peak hour only) and the eastbound left turn lane (both during the AM and PM peak hours). Although the 95th percentile queue is anticipated to exceed the available storage for the southbound left turn lane, there is sufficient storage within the striped median for vehicles to continue to stack without blocking the adjacent through lane. As such, no restriping is recommended. However, the eastbound left turn lane storage is limited due to the intersection spacing between Campus Avenue and N. 6th Avenue to the west. Although the 95th percentile queue exceeds the available storage, the existing turn eastbound left turn lane could accommodate the 50th percentile peak hour queues. The queuing issue for the eastbound left turn lane is anticipated for both Without and With Project traffic conditions. A potential solution would be to restripe additional storage west of N. 6th Avenue to continue the eastbound left turn storage in conjunction with "Do Not Block" striping at N. 6th Avenue on 14th Street to prohibit turning vehicles from blocking access to and from N. 6th Avenue. Worksheets for Horizon Year (2040) Without and With Project traffic conditions queuing analyses are provided in Appendices 7.5 and 7.6, respectively.

## 7.7 DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

All study area intersections are anticipated to operate at acceptable LOS for Horizon Year (2040) Without and With Project traffic conditions. As such, no intersection improvements have been recommended.

## EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS

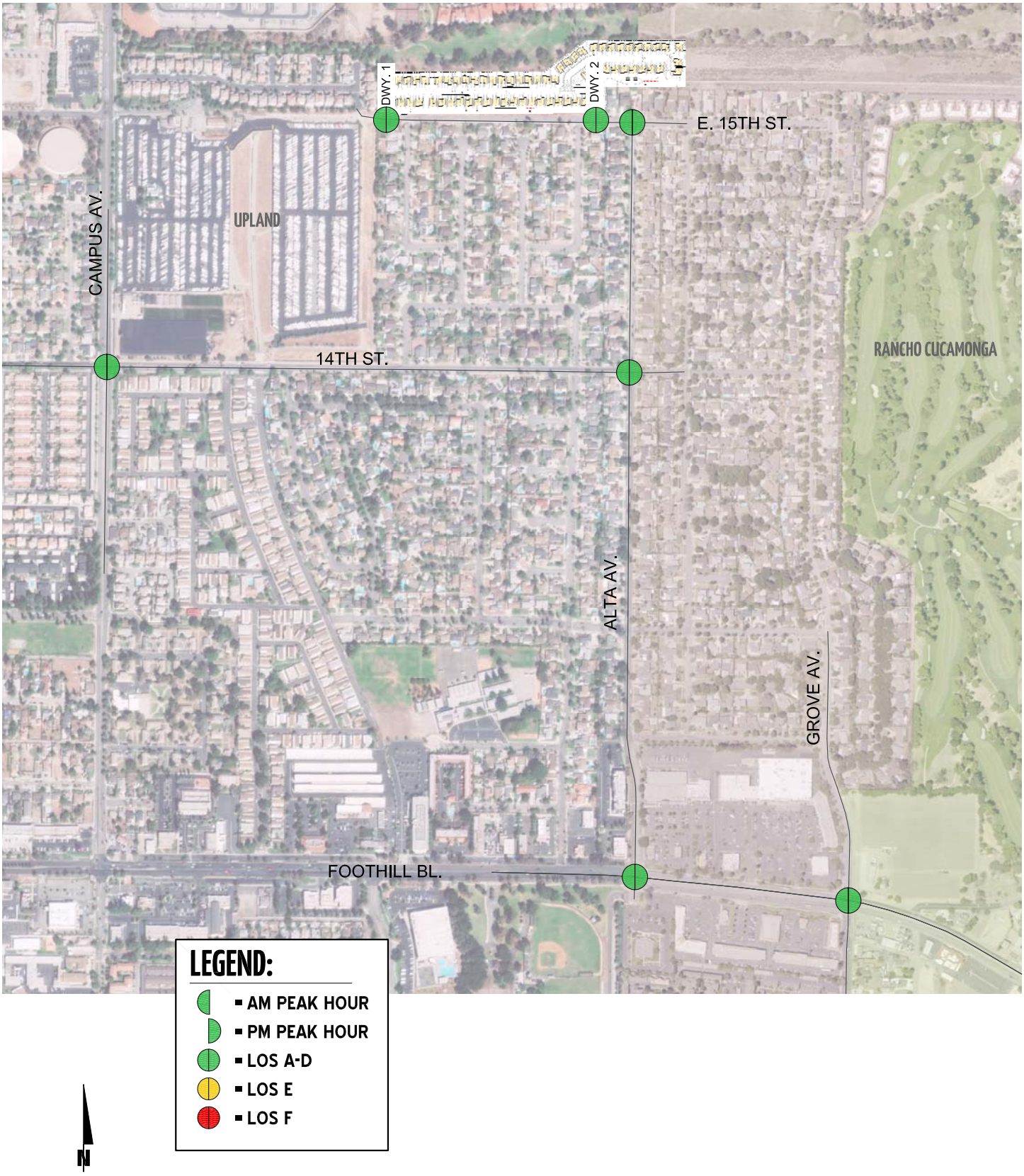

**Table 7-2**

**Peak Hour Queuing Summary for Horizon Year (2040) Conditions**

| Intersection | Movement[4] | Available Stacking Distance (Feet) | 2040 Without Project | | | | 2040 With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95th Percentile Queue (Feet) | | Acceptable?[1] | | 95th Percentile Queue (Feet) | | Acceptable?[1] | |
| | | | AM Peak Hour | PM Peak Hour | AM | PM | AM Peak Hour | PM Peak Hour | AM | PM |
| Campus Av. & 14th St. | NBL | 100 | 63 [2] | 41 | Yes | Yes | 70 [2] | 40 | Yes | Yes |
| | SBL | 100 | 76 | 161 [2] | Yes | Yes[2] | 83 | 175 [2] | Yes | Yes[2] |
| | EBL | 60 | 75 | 158 [2] | **No** | **No** | 76 | 169 [2] | **No** | **No** |
| | WBL | 80 | 28 | 62 | Yes | Yes | 31 | 29 | Yes | Yes |

* **BOLD** = Queue length exceeds available stacking distance.

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, however, there is sufficient storage within the striped median for vehicles to continue to stack without blocking the adjacent through lane. As such, no restriping is recommended.

# 8 REFERENCES

1. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.

2. **Institute of Transportation Engineers.** *Trip Generation.* 10th Edition. 2017.

3. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.

4. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated December 2007.

5. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.

6. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2014.

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# APPENDIX 1.1:

# APPROVED SCOPING AGREEMENT

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JN 11822

## SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Upland requirements for Traffic impact analysis of the following project. The analysis must follow either the Riverside County Transportation Department Traffic Study Guidelines dated **April 2008**; or San Bernardino County Transportation Authority (SBCTA) congestion management plan (CMP) guidelines as applicable.

Case No.
Related Cases-
SP No.
EIR No.
GPA No.
CZ No.
Project Name: Upland Colonies
Project Address: N. of 15th St. between Himalayas Cir + Monte Verde Av.
Project Description: 85 Single Family Detached DUs

| | Consultant | Developer |
|---|---|---|
| Name: | Urban Crossroads, Inc. - Charlene | Frontier Communities |
| Address: | 260 E. Baker St. Ste 200 80<br>Costa Mesa, CA 92626 | 2151 E. Convention Center Wy. #222<br>Ontario, CA 91764 |
| Telephone: | (949) 660-1994 | |
| Fax: | | |

**A. Trip Generation Source:** ITE Trip Generation Manual (10th Ed, 2017)

Current GP Land Use FC (Flood Control) Proposed Land Use Residential
Current Zoning PB-FC Proposed Zoning Residential

| | Current Trip Generation | | | Proposed Trip Generation | | |
|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total |
| AM Trips | | | Ø | 16 | 48 | 64 |
| PM Trips | | | Ø | 53 | 31 | 84 |

Internal Trip Allowance Yes (No) (__%Trip Discount)
Pass-By Trip Allowance Yes (No) (__%Trip Discount)

**B. Trip Geographic Distribution:** N 40 % S 45 % E Ø % W 15 %
(See attached exhibits for detailed assignment)

**C. Background Traffic**

Project Build-out Year 2020 Annual Ambient Growth Rate: 2.0 per year
Phase Year(s) NA
Other area projects to be analyzed:
Model/ Forecast methodology: NA

**D. Study Intersections:** (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies)

1. Campus Av. / 14th St.
2. N. 13th Av. / 15th St.
3. Alta Av. / 15th St.
4. Alta Av. / 14th St.

PM ALTA / FOOTHILL
PM GROVE / FOOTHILL

**E. Study Roadway Segments:** (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies)

NA

**F. Other Jurisdictional Impacts**

Is this project within a City's Sphere of Influence or one- mile radius of City boundaries? (Yes) No

If so, name of City Jurisdiction: Rancho Cucamonga

**G. Site Plan** (Provide reduced copy) see EX. 1

**H. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline)** (To be filled out by local agency)

See Scoping memo

**J. Existing Conditions**

Traffic count data must be new or recent within one year. Provide traffic count dates if using other than new counts.
Date of counts Jul 4 2018 (will manually add local school traffic)

**Recommended by:**

Consultant's Representative

7/9/18
Date

Scoping Agreement Submitted on 6/27/18
Revised on 7/9/18

**Approved Scoping Agreement:**

Rosemary Hernandez
City Engineer

7/10/18
Date

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

July 9, 2018

Mr. Ponce Yambot
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

**SUBJECT: UPLAND COLONIES SCOPING AGREEMENT**

Dear Mr. Ponce Yambot:

Urban Crossroads, Inc. is pleased to submit this scoping agreement to the City of Upland for the proposed Upland Colonies development ("Project"), which is located north of 15th Street between Himalayas Circle and Monte Verde Avenue in the City of Upland. It is our understanding that the Project is to consist of 85 single family detached residential dwelling units. The Project is anticipated to be constructed in one phase by the year 2020. The proposed Project land use and zoning are consistent with the City of Upland's General Plan, as such, long-range analysis is not proposed. A preliminary site plan, of which the traffic study will be based on, is shown on Exhibit 1. As identified in Exhibit 1, Driveway 1 on 15th Street is proposed to align with the existing 13th Avenue.

The purpose of this agreement is to obtain comments from City of Upland on the proposed traffic study scope of work. The remainder of this agreement describes the proposed analysis methodology, trip generation, trip distribution, and traffic assignment/project trips on the surrounding roadway network, which have been used to establish the proposed project study area and analysis locations.

## STUDY AREA

Consistent with County of San Bernardino traffic study guidelines, the study area limits have been set based upon a threshold of 50 peak hour project trips. In other words, the study area includes any intersection of Collector roadway or higher classification street with another Collector roadway or higher classification street, at which the proposed Project will add 50 or more peak hour trips. This methodology is also utilized in other near-by agencies. The proposed intersection analysis locations have been identified on Exhibit 2.

## ANALYSIS SCENARIOS

The following analysis scenarios will be analyzed for this traffic study:

- Existing (2018)
- Existing Plus Project (E+P)
- Opening Year Cumulative (2020) Without Project

- Opening Year Cumulative (2020) With Project

## METHODOLOGY

The intersection operations analysis will be reported using the Highway Capacity Manual (HCM 6th Edition) methodology for the study area intersections. HCM results are reported in delay (seconds).

## LEVEL OF SERVICE (LOS) CRITERIA

The City of Upland 2015 General Plan has established minimum LOS standards. Specifically, General Plan Policies CIR-1.1c and CIR-1.1d establish minimum standards to be applied o any TIA, as follows:

- Policy CIR-1.1c: Strive to maintain LOS D at all intersections outside of the Downtown Specific Plan area and the Transit Priority Roadways except where such improvements are physically infeasible or would negatively impact bicyclists, pedestrians, or transit patrons.
- Policy CIR-1.1d: Strive to maintain LOS E at all intersections within the Downtown Specific Plan area and intersections along the Transit Priority Roadways.

## THRESHOLD OF SIGNIFICANCE

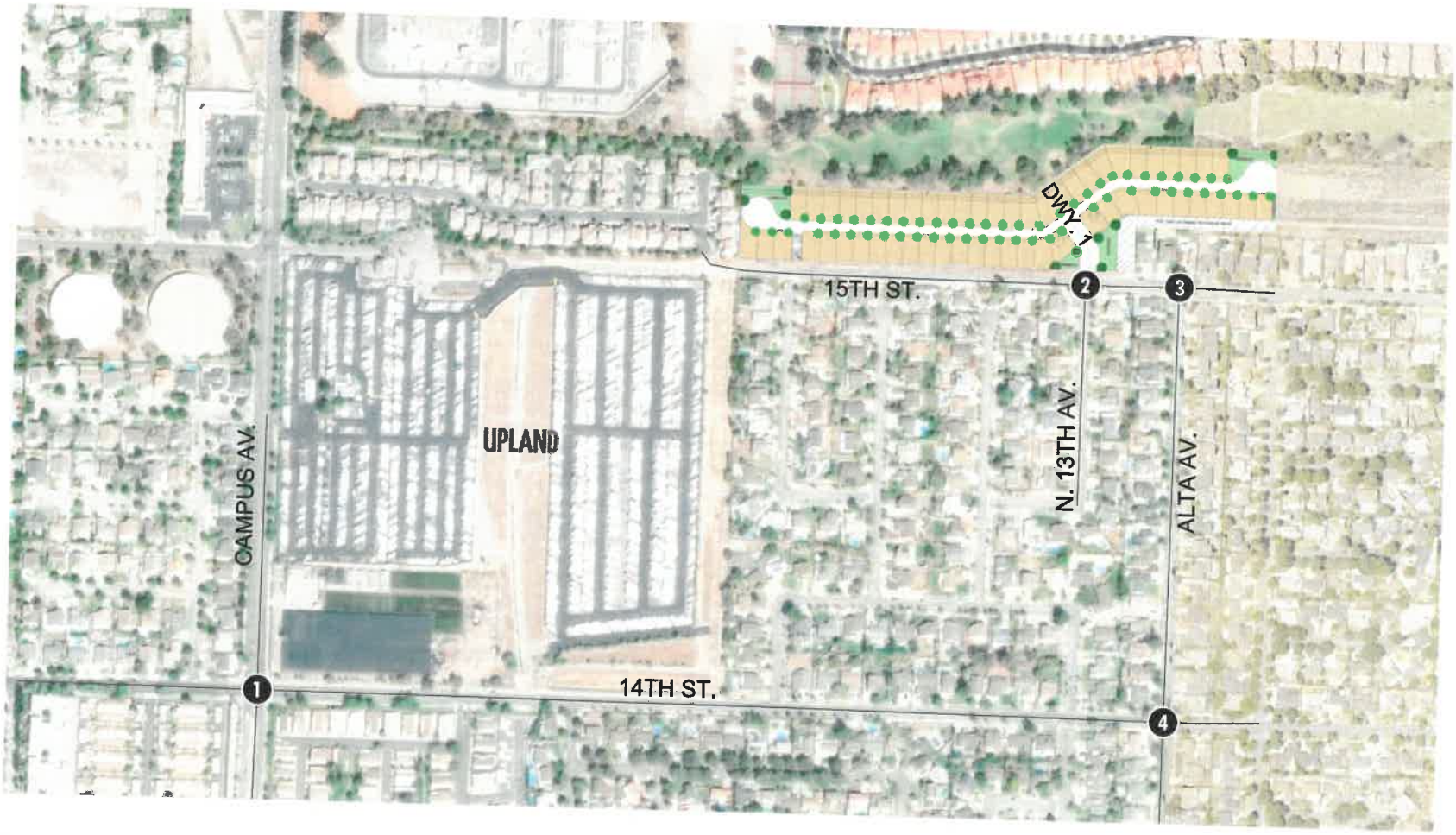
To determine whether the addition of Project traffic at a study intersection results in a significant impact, the following thresholds of significance will be utilized:

- Any study intersection that is operating at a LOS A, B, C, or D for any study scenario without Project traffic in which the addition of Project traffic causes the intersection to degrade to a LSO E or LOS F shall mitigate that impact so as to bring the intersection back to at least LOS D.
- Any study intersection that is operating at LOS E or LOS F for any study scenario without Project traffic shall mitigate any impacts so as to bring the intersection back to at least LOS D.

## PROJECT TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. Trip generation rates for the Project are shown in Table 1 illustrating daily and peak hour trip generation estimates based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017, for Single Family Detached Residential (ITE Land Use Code 210). The proposed Project is anticipated to generate a net total of approximately 802 trip-ends per day with 64 AM peak hour trips and 84 PM peak hour trips, as shown on Table 1.

## EXHIBIT 2: LOCATION MAP




**LEGEND:**

0 = EXISTING INTERSECTION ANALYSIS LOCATION

N

11822 - locmap.dwg

## EXHIBIT 3: PROJECT TRIP DISTRIBUTION




**LEGEND:**

10 = PERCENT TO/FROM PROJECT

N

## EXHIBIT 1: PRELIMINARY SITE PLAN




11822 - siteplan.dwg

## PROJECT TRIP DISTRIBUTIONS

The proposed Project trip distribution patterns are provided on Exhibit 3.

## AMBIENT GROWTH RATE

Consistent with other City of Upland traffic studies, an ambient growth rate of 2.0 percent per year will be used for this analysis.

## EXISTING COUNT DATA

Although schools are currently not in session, we are proposing to conduct the traffic counts then manually add the traffic associated with the near-by schools to conservatively estimate forecasts for the Existing (2018) baseline condition.

## SPECIAL ISSUES

The following special issues will be addressed as part of the TIA:

- Traffic signal warrant analyses will be conducted for all unsignalized study area intersections for all applicable analysis scenarios.
- Perform a queuing analysis for the intersection of Campus Avenue and 14th Street. Determine if the left turn pocket storage is sufficient for all approaches. Also, determine if the current traffic signal phasing should be modified (currently permissive phasing).

## CUMULATIVE DEVELOPMENT PROJECTS

It is requested that the City provide a list of cumulative development projects that are either currently being processed or have been approved for inclusion in our traffic study.

If you have any questions, please contact me directly at (949) 336-5982.

Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Senior Associate

## Table 1

### Project Trip Generation Summary

| Land Use[1] | ITE LU Code | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Rates** | | | | | | | | | |
| Single Family Residential Detached | 210 | DU | 0.19 | 0.56 | 0.74 | 0.62 | 0.37 | 0.99 | 9.44 |

| Project | Quantity | Units[2] | AM Peak Hour | | | PM Peak Hour | | | Daily |
|---|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total | |
| **Project Trip Generation Summary** | | | | | | | | | |
| Upland Colonies | 85 | DU | 16 | 48 | 64 | 53 | 31 | 84 | 802 |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

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# APPENDIX 3.1:

# EXISTING TRAFFIC COUNTS – JULY 2018

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# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: Campus
EAST & WEST: 14th

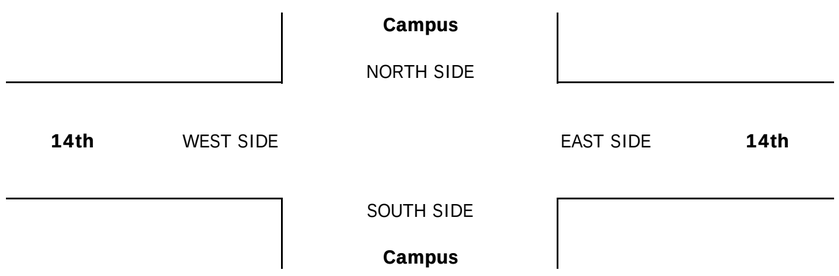
PROJECT #: SC
LOCATION #: 1
CONTROL: SIGNAL

NOTES:

AM PM MD OTHER OTHER — ▲ N, ◄ W, E ►, S ▼

☑ Add U-Turns to Left Turns

| | | NORTHBOUND Campus | | | SOUTHBOUND Campus | | | EASTBOUND 14th | | | WESTBOUND 14th | | | | U-TURNS | | | | | RTOR | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 2 | NR 0 | SL 1 | ST 2 | SR 0 | EL 1 | ET 1 | ER 0 | WL 1 | WT 1 | WR 0 | TOTAL | NB 0 | SB 0 | EB 0 | WB 0 | TTL | NRR 0 | SRR 0 | ERR 0 | WRR 0 |
| AM | 7:00 AM | 0 | 53 | 2 | 12 | 74 | 5 | 5 | 5 | 1 | 4 | 9 | 27 | 197 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 |
| | 7:15 AM | 0 | 73 | 1 | 11 | 91 | 6 | 5 | 6 | 4 | 12 | 5 | 25 | 239 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 |
| | 7:30 AM | 0 | 102 | 4 | 12 | 121 | 5 | 5 | 6 | 7 | 8 | 19 | 32 | 321 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 10 |
| | 7:45 AM | 3 | 89 | 4 | 22 | 140 | 5 | 6 | 10 | 2 | 11 | 18 | 33 | 343 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| | 8:00 AM | 3 | 78 | 9 | 16 | 100 | 3 | 6 | 9 | 5 | 8 | 18 | 15 | 270 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 11 |
| | 8:15 AM | 1 | 73 | 2 | 20 | 120 | 4 | 8 | 5 | 1 | 4 | 9 | 17 | 264 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| | 8:30 AM | 2 | 82 | 6 | 15 | 105 | 4 | 7 | 4 | 3 | 4 | 9 | 28 | 269 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 11 |
| | 8:45 AM | 2 | 91 | 4 | 26 | 159 | 5 | 3 | 10 | 8 | 7 | 21 | 29 | 365 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 10 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 11 | 641 | 32 | 134 | 910 | 37 | 45 | 55 | 31 | 58 | 108 | 206 | 2,268 | 0 | 0 | 0 | 0 | 0 | 8 | 5 | 10 | 71 |
| | APPROACH % | 2% | 94% | 5% | 12% | 84% | 3% | 34% | 42% | 24% | 16% | 29% | 55% | | | | | | | | | | |
| | APP/DEPART | 684 | / | 892 | 1,081 | / | 999 | 131 | / | 221 | 372 | / | 156 | 0 | | | | | | | | | |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | | | | | | | | | | |
| | VOLUMES | 7 | 342 | 19 | 70 | 481 | 17 | 25 | 30 | 15 | 31 | 64 | 97 | 1,198 | | | | | | 4 | 2 | 5 | 30 |
| | APPROACH % | 2% | 93% | 5% | 12% | 85% | 3% | 36% | 43% | 21% | 16% | 33% | 51% | | | | | | | | | | |
| | PEAK HR FACTOR | | 0.868 | | | 0.850 | | | 0.875 | | | 0.774 | | 0.873 | | | | | | | | | |
| | APP/DEPART | 368 | / | 464 | 568 | / | 527 | 70 | / | 119 | 192 | / | 88 | 0 | | | | | | | | | |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 2 | 149 | 9 | 23 | 147 | 9 | 12 | 22 | 4 | 9 | 16 | 24 | 426 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 8 |
| | 4:15 PM | 4 | 167 | 11 | 25 | 113 | 9 | 6 | 18 | 4 | 7 | 14 | 23 | 401 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 10 |
| | 4:30 PM | 3 | 154 | 6 | 28 | 123 | 11 | 17 | 22 | 10 | 6 | 14 | 32 | 426 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 12 |
| | 4:45 PM | 4 | 167 | 14 | 30 | 124 | 7 | 15 | 30 | 3 | 7 | 21 | 24 | 446 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 5 |
| | 5:00 PM | 6 | 194 | 11 | 23 | 115 | 8 | 24 | 27 | 3 | 11 | 10 | 23 | 455 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 7 |
| | 5:15 PM | 4 | 196 | 8 | 33 | 137 | 18 | 21 | 28 | 3 | 7 | 16 | 25 | 496 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 7 |
| | 5:30 PM | 4 | 182 | 16 | 37 | 135 | 7 | 15 | 22 | 4 | 7 | 13 | 27 | 469 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 9 |
| | 5:45 PM | 2 | 150 | 9 | 33 | 157 | 7 | 13 | 13 | 6 | 7 | 11 | 28 | 436 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 |
| | VOLUMES | 29 | 1,359 | 84 | 232 | 1,051 | 76 | 123 | 182 | 37 | 61 | 115 | 206 | 3,555 | 0 | 0 | 0 | 0 | 0 | 10 | 11 | 14 | 65 |
| | APPROACH % | 2% | 92% | 6% | 17% | 77% | 6% | 36% | 53% | 11% | 16% | 30% | 54% | | | | | | | | | | |
| | APP/DEPART | 1,472 | / | 1,688 | 1,359 | / | 1,149 | 342 | / | 498 | 382 | / | 220 | 0 | | | | | | | | | |
| | BEGIN PEAK HR | | 4:45 PM | | | | | | | | | | | | | | | | | | | | |
| | VOLUMES | 18 | 739 | 49 | 123 | 511 | 40 | 75 | 107 | 13 | 32 | 60 | 99 | 1,866 | | | | | | 8 | 4 | 6 | 28 |
| | APPROACH % | 2% | 92% | 6% | 18% | 76% | 6% | 38% | 55% | 7% | 17% | 31% | 52% | | | | | | | | | | |
| | PEAK HR FACTOR | | 0.955 | | | 0.896 | | | 0.903 | | | 0.918 | | 0.941 | | | | | | | | | |
| | APP/DEPART | 806 | / | 913 | 674 | / | 556 | 195 | / | 279 | 191 | / | 118 | 0 | | | | | | | | | |




| | | ALL PED AND BIKE | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | ES | WS | SS | NS | TOTAL |
| AM | 7:00 AM | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| | 7:15 AM | 2 | 1 | 1 | 1 | 5 | 1 | 1 | 1 | 1 | 4 | 1 | 0 | 0 | 0 | 1 |
| | 7:30 AM | 0 | 1 | 1 | 1 | 3 | 0 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 0 | 0 | 22 | 0 | 22 | 0 | 0 | 22 | 0 | 22 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 2 | 1 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 5 | 4 | 25 | 2 | 36 | 4 | 3 | 25 | 2 | 34 | 1 | 1 | 0 | 0 | 2 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| | 4:45 PM | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | 5:15 PM | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| | 5:30 PM | 0 | 1 | 2 | 0 | 3 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 4 | 2 | 6 | 3 | 15 | 2 | 2 | 4 | 3 | 11 | 2 | 0 | 2 | 0 | 4 |

# INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: 13th
EAST & WEST: 15th
PROJECT #: SC
LOCATION #: 2
CONTROL: STOP N

NOTES:

AM PM MD OTHER OTHER

▲ N
◄ W E ►
S ▼

☑ Add U-Turns to Left Turns

| | | NORTHBOUND 13th | | | SOUTHBOUND 13th | | | EASTBOUND 15th | | | WESTBOUND 15th | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 0 | NT X | NR 0 | SL X | ST X | SR X | EL X | ET 1 | ER 0 | WL 0 | WT 1 | WR X | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| | 8:30 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 10 |
| | APPROACH % | 25% | 0% | 75% | 0% | 0% | 0% | 0% | 0% | 0% | 67% | 33% | 0% | |
| | APP/DEPART | 4 | / | 0 | 0 | / | 4 | 0 | / | 4 | 6 | / | 2 | 0 |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | |
| | VOLUMES | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 7 |
| | APPROACH % | 50% | 0% | 50% | 0% | 0% | 0% | 0% | 0% | 0% | 60% | 40% | 0% | |
| | PEAK HR FACTOR | | 0.500 | | | 0.000 | | | 0.000 | | | 0.417 | | 0.583 |
| | APP/DEPART | 2 | / | 0 | 0 | / | 3 | 0 | / | 2 | 5 | / | 2 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 |
| | 4:45 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 4 |
| | 5:00 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 5 |
| | 5:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 4 |
| | VOLUMES | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 6 | 1 | 6 | 10 | 0 | 26 |
| | APPROACH % | 33% | 0% | 67% | 0% | 0% | 0% | 0% | 86% | 14% | 38% | 63% | 0% | |
| | APP/DEPART | 3 | / | 0 | 0 | / | 8 | 7 | / | 8 | 16 | / | 10 | 0 |
| | BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 4 | 7 | 0 | 16 |
| | APPROACH % | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 67% | 33% | 36% | 64% | 0% | |
| | PEAK HR FACTOR | | 0.500 | | | 0.000 | | | 0.375 | | | 0.688 | | 0.800 |
| | APP/DEPART | 2 | / | 0 | 0 | / | 5 | 3 | / | 4 | 11 | / | 7 | 0 |

| U-TURNS | | | | | RTOR | | | |
|---|---|---|---|---|---|---|---|---|
| NB | SB | EB | WB | TTL | NRR | SRR | ERR | WRR |
| 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| | | | | | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| | | | | | 0 | 0 | 0 | 0 |

13th

NORTH SIDE

15th WEST SIDE EAST SIDE 15th

SOUTH SIDE

13th

| | | ALL PED AND BIKE | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | ES | WS | SS | NS | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 1 | 0 | 2 | 0 | 3 | 1 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 1 | 0 | 3 | 0 | 4 | 1 | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: Alta
EAST & WEST: 15th

PROJECT #: SC
LOCATION #: 3
CONTROL: STOP N/S

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N
◄ W
E ►
S ▼

☑ Add U-Turns to Left Turns

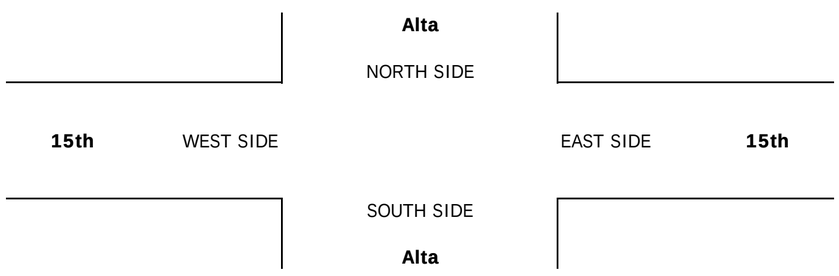
| | | NORTHBOUND Alta | | | SOUTHBOUND Alta | | | EASTBOUND 15th | | | WESTBOUND 15th | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 0 | NT X | NR 0 | SL X | ST X | SR X | EL X | ET 1 | ER 0 | WL 0 | WT 1 | WR X | TOTAL |
| AM | 7:00 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 7:30 AM | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 5 |
| | 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 5 |
| | 8:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 6 |
| | 8:15 AM | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 9 |
| | 8:30 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 |
| | 8:45 AM | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 4 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 3 | 0 | 9 | 0 | 0 | 0 | 0 | 3 | 3 | 14 | 4 | 0 | 37 |
| | APPROACH % | 25% | 0% | 75% | 0% | 0% | 0% | 0% | 50% | 50% | 78% | 22% | 0% | |
| | APP/DEPART | 12 | / | 0 | 0 | / | 18 | 6 | / | 12 | 18 | / | 6 | 0 |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | |
| | VOLUMES | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 4 | 0 | 25 |
| | APPROACH % | 13% | 0% | 88% | 0% | 0% | 0% | 0% | 60% | 40% | 67% | 33% | 0% | |
| | PEAK HR FACTOR | | 0.667 | | | 0.000 | | | 0.625 | | | 0.600 | | 0.694 |
| | APP/DEPART | 8 | / | 0 | 0 | / | 10 | 5 | / | 10 | 12 | / | 5 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 7 |
| | 4:15 PM | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 8 |
| | 4:30 PM | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 7 |
| | 4:45 PM | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 9 |
| | 5:00 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 7 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 3 |
| | 5:30 PM | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 7 |
| | 5:45 PM | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 7 |
| | VOLUMES | 8 | 0 | 18 | 0 | 0 | 0 | 0 | 7 | 2 | 8 | 12 | 0 | 57 |
| | APPROACH % | 31% | 0% | 69% | 0% | 0% | 0% | 0% | 78% | 22% | 40% | 60% | 0% | |
| | APP/DEPART | 26 | / | 0 | 0 | / | 12 | 9 | / | 26 | 20 | / | 17 | 0 |
| | BEGIN PEAK HR | | 4:00 PM | | | | | | | | | | | |
| | VOLUMES | 4 | 0 | 9 | 0 | 0 | 0 | 0 | 6 | 0 | 5 | 7 | 0 | 31 |
| | APPROACH % | 31% | 0% | 69% | 0% | 0% | 0% | 0% | 100% | 0% | 42% | 58% | 0% | |
| | PEAK HR FACTOR | | 0.650 | | | 0.000 | | | 0.750 | | | 0.750 | | 0.861 |
| | APP/DEPART | 13 | / | 0 | 0 | / | 7 | 6 | / | 15 | 12 | / | 9 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| | | | | |
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 3 | 0 | 0 | 1 | 4 |
| | | | | |
| | | | | |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| | | | |
| | | | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| | | | |
| | | | |




| | | ALL PED AND BIKE | | | | |
|---|---|---|---|---|---|---|
| | | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
| AM | 7:00 AM | 0 | 1 | 1 | 0 | 2 |
| | 7:15 AM | 0 | 1 | 0 | 0 | 1 |
| | 7:30 AM | 1 | 0 | 0 | 1 | 2 |
| | 7:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 1 | 0 | 0 | 1 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 1 | 3 | 1 | 1 | 6 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 0 | 0 | 0 |

| | | PEDESTRIAN CROSSINGS | | | | |
|---|---|---|---|---|---|---|
| | | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
| AM | 7:00 AM | 0 | 1 | 1 | 0 | 2 |
| | 7:15 AM | 0 | 1 | 0 | 0 | 1 |
| | 7:30 AM | 1 | 0 | 0 | 1 | 2 |
| | 7:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 1 | 0 | 0 | 1 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 1 | 3 | 1 | 1 | 6 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 0 | 0 | 0 |

| | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|
| | | ES | WS | SS | NS | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 0 | 0 | 0 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 0 | 0 | 0 |

# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: Alta
EAST & WEST: 14th

PROJECT #: SC
LOCATION #: 4
CONTROL: STOP N/S

NOTES:

AM
PM
MD
OTHER
OTHER

N
W
E
S

Add U-Turns to Left Turns

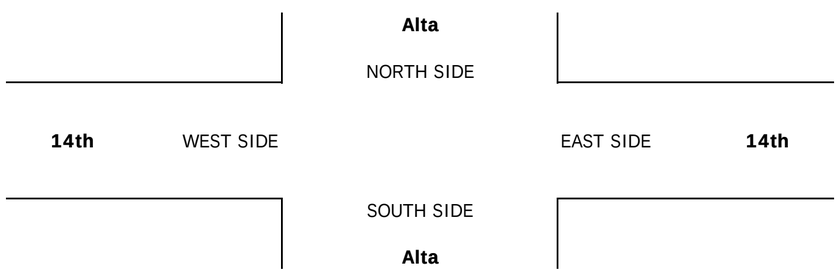
| | | NORTHBOUND Alta | | | SOUTHBOUND Alta | | | EASTBOUND 14th | | | WESTBOUND 14th | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 0 | NT 1 | NR 0 | SL 0 | ST 1 | SR 0 | EL 0 | ET 1 | ER 0 | WL 0 | WT 1 | WR 0 | TOTAL |
| AM | 7:00 AM | 3 | 0 | 0 | 1 | 0 | 3 | 2 | 12 | 2 | 1 | 18 | 1 | 43 |
| | 7:15 AM | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 7 | 4 | 1 | 17 | 0 | 35 |
| | 7:30 AM | 2 | 3 | 0 | 2 | 0 | 6 | 1 | 17 | 2 | 1 | 20 | 0 | 54 |
| | 7:45 AM | 6 | 0 | 0 | 0 | 1 | 4 | 1 | 21 | 5 | 0 | 23 | 1 | 62 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 13 | 7 | 1 | 11 | 0 | 35 |
| | 8:15 AM | 3 | 1 | 0 | 1 | 0 | 3 | 4 | 14 | 3 | 0 | 12 | 0 | 41 |
| | 8:30 AM | 7 | 2 | 0 | 0 | 2 | 6 | 0 | 9 | 5 | 0 | 18 | 1 | 50 |
| | 8:45 AM | 5 | 0 | 0 | 0 | 1 | 2 | 1 | 17 | 15 | 1 | 20 | 0 | 62 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 28 | 6 | 0 | 4 | 4 | 29 | 11 | 110 | 43 | 5 | 139 | 3 | 382 |
| | APPROACH % | 82% | 18% | 0% | 11% | 11% | 78% | 7% | 67% | 26% | 3% | 95% | 2% | |
| | APP/DEPART | 34 | / | 20 | 37 | / | 54 | 164 | / | 114 | 147 | / | 194 | 0 |
| | BEGIN PEAK HR | | 7:00 AM | | | | | | | | | | | |
| | VOLUMES | 13 | 3 | 0 | 3 | 1 | 16 | 5 | 57 | 13 | 3 | 78 | 2 | 194 |
| | APPROACH % | 81% | 19% | 0% | 15% | 5% | 80% | 7% | 76% | 17% | 4% | 94% | 2% | |
| | PEAK HR FACTOR | | 0.667 | | | 0.625 | | | 0.694 | | | 0.865 | | 0.782 |
| | APP/DEPART | 16 | / | 10 | 20 | / | 17 | 75 | / | 60 | 83 | / | 107 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 7 | 1 | 1 | 1 | 0 | 2 | 4 | 23 | 5 | 1 | 26 | 1 | 72 |
| | 4:15 PM | 7 | 1 | 0 | 0 | 0 | 4 | 4 | 27 | 4 | 0 | 19 | 1 | 67 |
| | 4:30 PM | 5 | 2 | 0 | 0 | 1 | 3 | 5 | 24 | 4 | 0 | 31 | 1 | 76 |
| | 4:45 PM | 10 | 3 | 1 | 0 | 0 | 2 | 4 | 33 | 12 | 0 | 23 | 0 | 88 |
| | 5:00 PM | 8 | 0 | 0 | 1 | 2 | 4 | 2 | 23 | 8 | 0 | 15 | 0 | 63 |
| | 5:15 PM | 6 | 1 | 0 | 1 | 1 | 1 | 4 | 32 | 2 | 0 | 15 | 2 | 65 |
| | 5:30 PM | 6 | 2 | 1 | 1 | 1 | 2 | 6 | 32 | 4 | 0 | 23 | 0 | 78 |
| | 5:45 PM | 7 | 2 | 0 | 0 | 2 | 1 | 3 | 29 | 10 | 1 | 22 | 1 | 78 |
| | VOLUMES | 56 | 12 | 3 | 4 | 7 | 19 | 32 | 223 | 49 | 2 | 174 | 6 | 587 |
| | APPROACH % | 79% | 17% | 4% | 13% | 23% | 63% | 11% | 73% | 16% | 1% | 96% | 3% | |
| | APP/DEPART | 71 | / | 50 | 30 | / | 58 | 304 | / | 230 | 182 | / | 249 | 0 |
| | BEGIN PEAK HR | | 4:00 PM | | | | | | | | | | | |
| | VOLUMES | 29 | 7 | 2 | 1 | 1 | 11 | 17 | 107 | 25 | 1 | 99 | 3 | 303 |
| | APPROACH % | 76% | 18% | 5% | 8% | 8% | 85% | 11% | 72% | 17% | 1% | 96% | 3% | |
| | PEAK HR FACTOR | | 0.679 | | | 0.813 | | | 0.760 | | | 0.805 | | 0.861 |
| | APP/DEPART | 38 | / | 27 | 13 | / | 27 | 149 | / | 110 | 103 | / | 139 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 2 |
| | | | | |
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| | | | | |
| | | | | |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| | | | |
| | | | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| | | | |
| | | | |




| | | ALL PED AND BIKE | | | | |
|---|---|---|---|---|---|---|
| | | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
| AM | 7:00 AM | 2 | 0 | 0 | 0 | 2 |
| | 7:15 AM | 1 | 1 | 0 | 1 | 3 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 1 | 0 | 21 | 1 | 23 |
| | 8:00 AM | 0 | 0 | 0 | 1 | 1 |
| | 8:15 AM | 1 | 0 | 1 | 3 | 5 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 5 | 1 | 22 | 6 | 34 |
| PM | 3:00 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 1 | 1 | 2 |
| | 4:15 PM | 0 | 0 | 0 | 1 | 1 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 2 | 0 | 2 |
| | 5:00 PM | 0 | 0 | 2 | 0 | 2 |
| | 5:15 PM | 0 | 2 | 1 | 0 | 3 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 2 | 6 | 2 | 10 |

| PEDESTRIAN CROSSINGS | | | | |
|---|---|---|---|---|
| E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
| 2 | 0 | 0 | 0 | 2 |
| 1 | 1 | 0 | 1 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 21 | 1 | 23 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 4 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 5 | 1 | 22 | 4 | 32 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 2 | 0 | 2 |
| 0 | 0 | 2 | 0 | 2 |
| 0 | 2 | 1 | 0 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 6 | 1 | 9 |

| BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|
| ES | WS | SS | NS | TOTAL |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 2 | 2 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |

# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| | | | |
|---|---|---|---|
| DATE: Tue, Jul 17, 18 | LOCATION: | Upland | PROJECT #: SC |
| | NORTH & SOUTH: | Alta | LOCATION #: 5 |
| | EAST & WEST: | Foothill | CONTROL: SIGNAL |

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

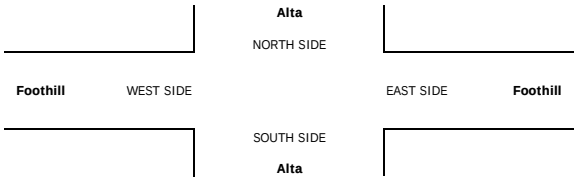
| | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 2 | 0 | 1 | 4 | 0 | 5 | 9 | 74 | 1 | 0 | 109 | 5 | 210 |
| 7:15 AM | 1 | 1 | 0 | 2 | 1 | 12 | 5 | 98 | 0 | 3 | 152 | 5 | 280 |
| 7:30 AM | 2 | 0 | 0 | 7 | 0 | 8 | 12 | 116 | 4 | 0 | 199 | 3 | 351 |
| 7:45 AM | 1 | 0 | 1 | 5 | 0 | 9 | 11 | 145 | 7 | 6 | 225 | 9 | 419 |
| 8:00 AM | 1 | 2 | 1 | 6 | 1 | 4 | 16 | 131 | 3 | 1 | 182 | 10 | 358 |
| 8:15 AM | 3 | 3 | 2 | 6 | 3 | 19 | 24 | 115 | 6 | 4 | 162 | 12 | 359 |
| 8:30 AM | 6 | 1 | 1 | 6 | 4 | 12 | 16 | 133 | 4 | 2 | 162 | 14 | 361 |
| 8:45 AM | 2 | 0 | 1 | 5 | 4 | 13 | 12 | 134 | 2 | 2 | 191 | 8 | 374 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 18 | 7 | 7 | 41 | 13 | 82 | 105 | 946 | 27 | 18 | 1,382 | 66 | 2,712 |
| APPROACH % | 56% | 22% | 22% | 30% | 10% | 60% | 10% | 88% | 3% | 1% | 94% | 5% | |
| APP/DEPART | 32 | / | 176 | 136 | / | 57 | 1,078 | / | 994 | 1,466 | / | 1,485 | 0 |
| BEGIN PEAK HR | | 7:45 AM | | | | | | | | | | | |
| VOLUMES | 11 | 6 | 5 | 23 | 8 | 44 | 67 | 524 | 20 | 13 | 731 | 45 | 1,497 |
| APPROACH % | 50% | 27% | 23% | 31% | 11% | 59% | 11% | 86% | 3% | 2% | 93% | 6% | |
| PEAK HR FACTOR | | 0.688 | | | 0.670 | | | 0.937 | | | 0.822 | | 0.893 |
| APP/DEPART | 22 | / | 118 | 75 | / | 41 | 611 | / | 551 | 789 | / | 787 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 5 | 4 | 6 | 13 | 2 | 19 | 22 | 259 | 3 | 1 | 203 | 5 | 542 |
| 4:15 PM | 3 | 3 | 4 | 15 | 2 | 19 | 20 | 269 | 6 | 5 | 175 | 13 | 534 |
| 4:30 PM | 2 | 1 | 4 | 19 | 3 | 22 | 16 | 314 | 4 | 3 | 216 | 9 | 613 |
| 4:45 PM | 3 | 3 | 6 | 11 | 0 | 20 | 21 | 315 | 5 | 2 | 191 | 4 | 581 |
| 5:00 PM | 7 | 4 | 4 | 22 | 6 | 34 | 22 | 350 | 3 | 7 | 205 | 3 | 667 |
| 5:15 PM | 1 | 1 | 4 | 10 | 2 | 15 | 20 | 340 | 6 | 3 | 226 | 10 | 638 |
| 5:30 PM | 6 | 10 | 4 | 16 | 3 | 15 | 27 | 301 | 2 | 3 | 217 | 7 | 611 |
| 5:45 PM | 4 | 1 | 1 | 15 | 2 | 20 | 12 | 303 | 3 | 2 | 212 | 7 | 582 |
| VOLUMES | 31 | 27 | 33 | 121 | 20 | 164 | 160 | 2,451 | 32 | 26 | 1,645 | 58 | 4,768 |
| APPROACH % | 34% | 30% | 36% | 40% | 7% | 54% | 6% | 93% | 1% | 2% | 95% | 3% | |
| APP/DEPART | 91 | / | 247 | 305 | / | 66 | 2,643 | / | 2,615 | 1,729 | / | 1,840 | 0 |
| BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | |
| VOLUMES | 13 | 9 | 18 | 62 | 11 | 91 | 79 | 1,319 | 18 | 15 | 838 | 26 | 2,499 |
| APPROACH % | 33% | 23% | 45% | 38% | 7% | 55% | 6% | 93% | 1% | 2% | 95% | 3% | |
| PEAK HR FACTOR | | 0.667 | | | 0.661 | | | 0.944 | | | 0.919 | | 0.937 |
| APP/DEPART | 40 | / | 114 | 164 | / | 37 | 1,416 | / | 1,406 | 879 | / | 942 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 3 | 1 | 5 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 0 | 12 | 14 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 2 | 0 | 1 |
| 0 | 10 | 0 | 0 |
| 0 | 5 | 1 | 0 |
| 0 | 2 | 1 | 1 |
| 0 | 2 | 0 | 1 |
| 1 | 11 | 1 | 3 |
| 1 | 4 | 1 | 3 |
| 0 | 8 | 0 | 1 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 2 | 44 | 4 | 10 |
| 2 | 19 | 3 | 8 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 3 | 12 | 0 | 0 |
| 3 | 9 | 1 | 2 |
| 2 | 14 | 1 | 1 |
| 4 | 13 | 0 | 2 |
| 1 | 16 | 0 | 0 |
| 4 | 10 | 0 | 1 |
| 2 | 10 | 0 | 2 |
| 1 | 6 | 0 | 1 |
| 20 | 90 | 2 | 9 |
| 11 | 53 | 1 | 4 |




**ALL PED AND BIKE**

| | E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
|---|---|---|---|---|---|
| 7:00 AM | 0 | 1 | 0 | 1 | 2 |
| 7:15 AM | 2 | 1 | 1 | 0 | 4 |
| 7:30 AM | 2 | 1 | 0 | 2 | 5 |
| 7:45 AM | 1 | 2 | 5 | 2 | 10 |
| 8:00 AM | 0 | 1 | 2 | 3 | 6 |
| 8:15 AM | 1 | 0 | 1 | 0 | 2 |
| 8:30 AM | 2 | 1 | 2 | 1 | 6 |
| 8:45 AM | 0 | 0 | 0 | 1 | 1 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 8 | 7 | 11 | 10 | 36 |
| 3:00 PM | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 2 | 0 | 2 |
| 4:15 PM | 5 | 2 | 3 | 3 | 13 |
| 4:30 PM | 1 | 0 | 0 | 2 | 3 |
| 4:45 PM | 5 | 4 | 7 | 4 | 20 |
| 5:00 PM | 1 | 3 | 1 | 2 | 7 |
| 5:15 PM | 4 | 0 | 3 | 3 | 10 |
| 5:30 PM | 1 | 1 | 3 | 1 | 6 |
| 5:45 PM | 4 | 1 | 3 | 0 | 8 |
| TOTAL | 21 | 11 | 22 | 15 | 69 |

**PEDESTRIAN CROSSINGS**

| E SIDE | W SIDE | S SIDE | N SIDE | TOTAL |
|---|---|---|---|---|
| 0 | 1 | 0 | 1 | 2 |
| 2 | 1 | 1 | 0 | 4 |
| 2 | 1 | 0 | 2 | 5 |
| 1 | 1 | 4 | 2 | 8 |
| 0 | 1 | 2 | 3 | 6 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 1 | 2 | 1 | 6 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 8 | 6 | 9 | 10 | 33 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 4 | 1 | 2 | 3 | 10 |
| 1 | 0 | 0 | 2 | 3 |
| 5 | 4 | 6 | 4 | 19 |
| 1 | 3 | 0 | 2 | 6 |
| 4 | 0 | 3 | 3 | 10 |
| 1 | 1 | 3 | 1 | 6 |
| 4 | 1 | 1 | 0 | 6 |
| 20 | 10 | 16 | 15 | 61 |

**BICYCLE CROSSINGS**

| ES | WS | SS | NS | TOTAL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 2 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 2 | 0 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 2 | 0 | 2 |
| 1 | 1 | 6 | 0 | 8 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 1:** PASSENGER VEHICLES

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

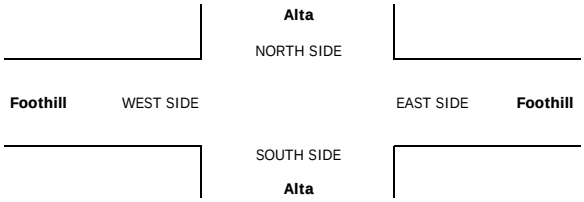
| | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 2 | 0 | 1 | 4 | 0 | 5 | 9 | 68 | 1 | 0 | 106 | 5 | 201 |
| 7:15 AM | 1 | 1 | 0 | 2 | 1 | 10 | 3 | 90 | 0 | 3 | 145 | 5 | 261 |
| 7:30 AM | 2 | 0 | 0 | 6 | 0 | 8 | 12 | 105 | 4 | 0 | 194 | 3 | 334 |
| 7:45 AM | 1 | 0 | 1 | 4 | 0 | 9 | 11 | 136 | 7 | 6 | 211 | 9 | 395 |
| 8:00 AM | 1 | 2 | 1 | 6 | 1 | 4 | 15 | 119 | 3 | 1 | 174 | 10 | 337 |
| 8:15 AM | 3 | 3 | 2 | 6 | 3 | 17 | 23 | 104 | 6 | 4 | 156 | 12 | 339 |
| 8:30 AM | 6 | 1 | 1 | 6 | 3 | 10 | 15 | 118 | 4 | 2 | 156 | 14 | 336 |
| 8:45 AM | 2 | 0 | 1 | 5 | 4 | 12 | 12 | 126 | 1 | 2 | 179 | 8 | 352 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 18 | 7 | 7 | 39 | 12 | 75 | 100 | 866 | 26 | 18 | 1,321 | 66 | 2,555 |
| APPROACH % | 56% | 22% | 22% | 31% | 10% | 60% | 10% | 87% | 3% | 1% | 94% | 5% | |
| APP/DEPART | 32 | / | 171 | 126 | / | 55 | 992 | / | 912 | 1,405 | / | 1,417 | 0 |
| BEGIN PEAK HR | | 7:45 AM | | | | | | | | | | | |
| VOLUMES | 11 | 6 | 5 | 21 | 7 | 40 | 63 | 477 | 20 | 13 | 697 | 45 | 1,407 |
| APPROACH % | 50% | 27% | 23% | 30% | 10% | 58% | 11% | 85% | 4% | 2% | 92% | 6% | |
| PEAK HR FACTOR | | 0.688 | | | 0.663 | | | 0.911 | | | 0.835 | | 0.891 |
| APP/DEPART | 22 | / | 115 | 69 | / | 40 | 561 | / | 503 | 755 | / | 749 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 3 | 4 | 6 | 13 | 2 | 19 | 20 | 253 | 3 | 1 | 197 | 5 | 526 |
| 4:15 PM | 3 | 3 | 4 | 13 | 2 | 19 | 19 | 261 | 5 | 5 | 171 | 13 | 518 |
| 4:30 PM | 2 | 1 | 4 | 17 | 3 | 21 | 16 | 308 | 4 | 3 | 206 | 9 | 594 |
| 4:45 PM | 3 | 3 | 5 | 11 | 0 | 20 | 21 | 297 | 5 | 2 | 185 | 4 | 556 |
| 5:00 PM | 7 | 4 | 4 | 22 | 6 | 34 | 21 | 343 | 3 | 7 | 197 | 3 | 651 |
| 5:15 PM | 1 | 1 | 4 | 10 | 2 | 14 | 20 | 333 | 6 | 3 | 219 | 10 | 623 |
| 5:30 PM | 6 | 10 | 4 | 16 | 3 | 15 | 27 | 291 | 2 | 3 | 210 | 7 | 594 |
| 5:45 PM | 4 | 1 | 1 | 15 | 2 | 20 | 12 | 292 | 2 | 2 | 204 | 5 | 560 |
| VOLUMES | 29 | 27 | 32 | 117 | 20 | 162 | 156 | 2,378 | 30 | 26 | 1,589 | 56 | 4,622 |
| APPROACH % | 33% | 31% | 36% | 39% | 7% | 54% | 6% | 93% | 1% | 2% | 95% | 3% | |
| APP/DEPART | 88 | / | 241 | 299 | / | 64 | 2,564 | / | 2,537 | 1,671 | / | 1,780 | 0 |
| BEGIN PEAK HR | | 5:00 PM | | | | | | | | | | | |
| VOLUMES | 18 | 16 | 13 | 61 | 13 | 83 | 80 | 1,259 | 13 | 7 | 830 | 25 | 2,428 |
| APPROACH % | 38% | 34% | 28% | 38% | 8% | 52% | 6% | 93% | 1% | 1% | 95% | 3% | |
| PEAK HR FACTOR | | 0.588 | | | 0.641 | | | 0.921 | | | 0.938 | | 0.932 |
| APP/DEPART | 47 | / | 123 | 159 | / | 33 | 1,352 | / | 1,341 | 870 | / | 931 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 3 | 1 | 5 |
| | | | | |
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 0 | 1 | 3 |
| 0 | 2 | 0 | 12 | 14 |
| | | | | |
| | | | | |

**RTOR**

| NRR 0 | SRR 0 | ERR 0 | WRR 0 |
|---|---|---|---|
| 0 | 2 | 0 | 1 |
| 0 | 8 | 0 | 0 |
| 0 | 5 | 1 | 0 |
| 0 | 2 | 1 | 1 |
| 0 | 2 | 0 | 1 |
| 1 | 11 | 1 | 3 |
| 1 | 3 | 1 | 3 |
| 0 | 8 | 0 | 1 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 2 | 41 | 4 | 10 |
| | | | |
| 2 | 18 | 3 | 8 |
| | | | |
| | | | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 3 | 12 | 0 | 0 |
| 3 | 9 | 0 | 2 |
| 2 | 13 | 1 | 1 |
| 3 | 13 | 0 | 2 |
| 1 | 16 | 0 | 0 |
| 4 | 10 | 0 | 1 |
| 2 | 10 | 0 | 2 |
| 1 | 6 | 0 | 1 |
| 19 | 89 | 1 | 9 |
| | | | |
| 8 | 42 | 0 | 4 |



## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 2:** 2-AXLE WORK VEHICLES/ TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

| | | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 0 | 6 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 3 | 0 | 8 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 2 | 0 | 7 |
| | 7:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 7 | 0 | 14 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 3 | 0 | 10 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 9 | 0 | 0 | 3 | 0 | 15 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 9 | 0 | 0 | 4 | 0 | 16 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 1 | 0 | 9 | 0 | 17 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 0 | 0 | 0 | 1 | 1 | 5 | 3 | 49 | 1 | 0 | 33 | 0 | 93 |
| | APPROACH % | 0% | 0% | 0% | 14% | 14% | 71% | 6% | 92% | 2% | 0% | 100% | 0% | |
| | APP/DEPART | 0 | / | 3 | 7 | / | 2 | 53 | / | 50 | 33 | / | 38 | 0 |
| | BEGIN PEAK HR | | 8:00 AM | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 31 | 1 | 0 | 19 | 0 | 58 |
| | APPROACH % | 0% | 0% | 0% | 0% | 20% | 80% | 6% | 91% | 3% | 0% | 100% | 0% | |
| | PEAK HR FACTOR | | 0.000 | | | 0.625 | | | 0.850 | | | 0.528 | | 0.853 |
| | APP/DEPART | 0 | / | 2 | 5 | / | 2 | 34 | / | 31 | 19 | / | 23 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 | 9 |
| | 4:15 PM | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 5 | 1 | 0 | 3 | 0 | 12 |
| | 4:30 PM | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 7 | 0 | 13 |
| | 4:45 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 2 | 0 | 16 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 5 | 0 | 11 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 6 | 0 | 11 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 5 | 0 | 12 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 0 | 6 | 2 | 19 |
| | VOLUMES | 1 | 0 | 1 | 4 | 0 | 2 | 4 | 50 | 2 | 0 | 37 | 2 | 103 |
| | APPROACH % | 50% | 0% | 50% | 67% | 0% | 33% | 7% | 89% | 4% | 0% | 95% | 5% | |
| | APP/DEPART | 2 | / | 6 | 6 | / | 2 | 56 | / | 55 | 39 | / | 40 | 0 |
| | BEGIN PEAK HR | | 5:00 PM | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 26 | 1 | 0 | 22 | 2 | 53 |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 100% | 4% | 93% | 4% | 0% | 92% | 8% | |
| | PEAK HR FACTOR | | 0.000 | | | 0.250 | | | 0.636 | | | 0.750 | | 0.697 |
| | APP/DEPART | 0 | / | 3 | 1 | / | 1 | 28 | / | 26 | 24 | / | 23 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 3:** 3-AXLE TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

| | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 7:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 0 | 8 | 0 | 15 |
| APPROACH % | 0% | 0% | 0% | 50% | 0% | 50% | 40% | 60% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 2 | 2 | / | 0 | 5 | / | 4 | 8 | / | 9 | 0 |
| BEGIN PEAK HR | | 7:15 AM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 7 | 0 | 10 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 33% | 67% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.750 | | | 0.350 | | 0.500 |
| APP/DEPART | 0 | / | 1 | 0 | / | 0 | 3 | / | 2 | 7 | / | 7 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 3 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 4 | 0 | 14 |
| APPROACH % | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 1 | / | 0 | 0 | / | 0 | 9 | / | 9 | 4 | / | 5 | 0 |
| BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 9 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.625 | | | 0.500 | | 0.750 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 5 | / | 5 | 4 | / | 4 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 4:** 4 OR MORE AXLE TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

| | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 7 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 3 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 6 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 0 | 5 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 16 | 0 | 0 | 10 | 0 | 27 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 0 | 1 | / | 0 | 16 | / | 16 | 10 | / | 11 | 0 |
| BEGIN PEAK HR | | 7:15 AM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 7 | 0 | 18 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.688 | | | 0.583 | | 0.643 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 11 | / | 11 | 7 | / | 7 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 7 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 2 | / | 2 | 5 | / | 5 | 0 |
| BEGIN PEAK HR | | 4:00 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 6 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.500 | | | 0.500 | | 0.500 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 2 | / | 2 | 4 | / | 4 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
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| 0 | 0 | 0 | 0 | 0 |
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| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
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| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
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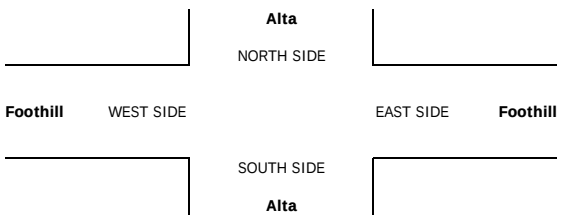
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |



## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 5:** RV

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

| | NORTHBOUND Alta | | | SOUTHBOUND Alta | | | EASTBOUND Foothill | | | WESTBOUND Foothill | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 1 | / | 1 | 1 | / | 1 | 0 |
| BEGIN PEAK HR | | 7:00 AM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.250 | | | 0.250 | | 0.500 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 1 | / | 1 | 1 | / | 1 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 |
| BEGIN PEAK HR | | 3:00 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.000 | | | 0.000 | | 0.000 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Alta | LOCATION #: | 5 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

| CLASS 6: | NOTES: |
|---|---|
| BUSES | |

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

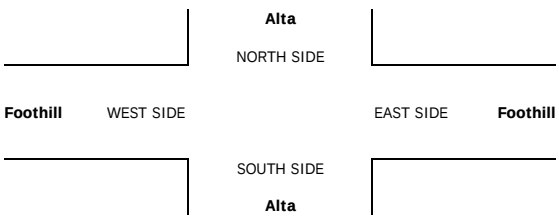
| | NORTHBOUND (Alta) | | | SOUTHBOUND (Alta) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT 2 | NR 0 | SL 0 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL |
| AM 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 5 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 4 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 9 | 0 | 20 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 11 | / | 11 | 9 | / | 9 | 0 |
| BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 6 | 0 | 13 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.583 | | | 0.750 | | 0.650 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 7 | / | 7 | 6 | / | 6 | 0 |
| PM 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 5 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 5 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 10 | 0 | 22 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 12 | / | 12 | 10 | / | 10 | 0 |
| BEGIN PEAK HR | | 4:45 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 5 | 0 | 13 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.667 | | | 0.625 | | 0.650 |
| APP/DEPART | 0 | / | 0 | 0 | / | 0 | 8 | / | 8 | 5 | / | 5 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |



# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: Grove
EAST & WEST: Foothill

PROJECT #: SC
LOCATION #: 6
CONTROL: SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

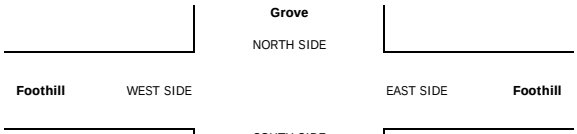
▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

| | NORTHBOUND (Grove) | | | SOUTHBOUND (Grove) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 19 | 19 | 8 | 8 | 12 | 2 | 2 | 44 | 21 | 9 | 117 | 10 | 271 |
| 7:15 AM | 27 | 11 | 12 | 12 | 19 | 6 | 0 | 77 | 22 | 11 | 134 | 11 | 342 |
| 7:30 AM | 27 | 14 | 12 | 16 | 25 | 5 | 4 | 83 | 26 | 21 | 177 | 8 | 418 |
| 7:45 AM | 41 | 20 | 10 | 23 | 18 | 1 | 2 | 107 | 39 | 18 | 189 | 3 | 471 |
| 8:00 AM | 42 | 17 | 13 | 13 | 15 | 5 | 3 | 96 | 24 | 17 | 153 | 23 | 421 |
| 8:15 AM | 34 | 18 | 11 | 15 | 22 | 2 | 3 | 85 | 32 | 17 | 146 | 23 | 408 |
| 8:30 AM | 47 | 21 | 15 | 12 | 21 | 4 | 2 | 90 | 33 | 15 | 142 | 15 | 417 |
| 8:45 AM | 44 | 26 | 16 | 16 | 30 | 4 | 1 | 98 | 33 | 21 | 141 | 16 | 446 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 281 | 146 | 97 | 115 | 162 | 29 | 17 | 680 | 230 | 129 | 1,199 | 109 | 3,194 |
| APPROACH % | 54% | 28% | 19% | 38% | 53% | 9% | 2% | 73% | 25% | 9% | 83% | 8% | |
| APP/DEPART | 524 | / | 268 | 306 | / | 520 | 927 | / | 893 | 1,437 | / | 1,513 | 0 |
| BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | |
| VOLUMES | 144 | 69 | 46 | 67 | 80 | 13 | 12 | 371 | 121 | 73 | 665 | 57 | 1,718 |
| APPROACH % | 56% | 27% | 18% | 42% | 50% | 8% | 2% | 74% | 24% | 9% | 84% | 7% | |
| PEAK HR FACTOR | | 0.899 | | | 0.870 | | | 0.851 | | | 0.946 | | 0.912 |
| APP/DEPART | 259 | / | 135 | 160 | / | 273 | 504 | / | 485 | 795 | / | 825 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 40 | 42 | 43 | 35 | 40 | 3 | 3 | 219 | 46 | 20 | 152 | 16 | 659 |
| 4:15 PM | 51 | 38 | 37 | 38 | 41 | 1 | 7 | 212 | 45 | 21 | 141 | 29 | 661 |
| 4:30 PM | 39 | 35 | 47 | 23 | 33 | 3 | 12 | 258 | 49 | 18 | 180 | 26 | 723 |
| 4:45 PM | 49 | 41 | 55 | 41 | 30 | 8 | 2 | 284 | 38 | 23 | 147 | 20 | 738 |
| 5:00 PM | 44 | 38 | 48 | 42 | 38 | 6 | 5 | 297 | 62 | 23 | 185 | 21 | 809 |
| 5:15 PM | 47 | 42 | 39 | 43 | 33 | 4 | 5 | 269 | 57 | 10 | 189 | 20 | 758 |
| 5:30 PM | 52 | 52 | 29 | 37 | 39 | 1 | 6 | 245 | 49 | 11 | 163 | 13 | 697 |
| 5:45 PM | 43 | 44 | 30 | 36 | 33 | 3 | 5 | 259 | 44 | 14 | 192 | 21 | 724 |
| VOLUMES | 365 | 332 | 328 | 295 | 287 | 29 | 45 | 2,043 | 390 | 140 | 1,349 | 166 | 5,769 |
| APPROACH % | 36% | 32% | 32% | 48% | 47% | 5% | 2% | 82% | 16% | 8% | 82% | 10% | |
| APP/DEPART | 1,025 | / | 531 | 611 | / | 814 | 2,478 | / | 2,669 | 1,655 | / | 1,755 | 0 |
| BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | |
| VOLUMES | 179 | 156 | 189 | 149 | 134 | 21 | 24 | 1,108 | 206 | 74 | 701 | 87 | 3,028 |
| APPROACH % | 34% | 30% | 36% | 49% | 44% | 7% | 2% | 83% | 15% | 9% | 81% | 10% | |
| PEAK HR FACTOR | | 0.903 | | | 0.884 | | | 0.919 | | | 0.941 | | 0.936 |
| APP/DEPART | 524 | / | 262 | 304 | / | 412 | 1,338 | / | 1,448 | 862 | / | 906 | 0 |

| U-TURNS NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 1 | 5 |
| 0 | 0 | 12 | 3 | 15 |

| RTOR NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 6 | 2 | 3 | 2 |
| 7 | 4 | 4 | 0 |
| 6 | 4 | 4 | 0 |
| 4 | 1 | 9 | 0 |
| 9 | 4 | 3 | 6 |
| 8 | 2 | 6 | 2 |
| 9 | 2 | 8 | 3 |
| 10 | 3 | 8 | 4 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 59 | 22 | 45 | 17 |
| 27 | 11 | 22 | 8 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 21 | 3 | 17 | 3 |
| 11 | 1 | 13 | 5 |
| 27 | 2 | 8 | 3 |
| 21 | 2 | 14 | 5 |
| 13 | 4 | 8 | 7 |
| 9 | 4 | 9 | 4 |
| 19 | 1 | 16 | 3 |
| 12 | 2 | 13 | 6 |
| 133 | 19 | 98 | 36 |
| 70 | 12 | 39 | 19 |




| | ALL PED AND BIKE E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | PEDESTRIAN CROSSINGS E SIDE | W SIDE | S SIDE | N SIDE | TOTAL | ES | WS | SS | NS | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 AM | 0 | 4 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 1 | 3 | 1 | 1 | 6 | 0 | 3 | 1 | 0 | 4 | 1 | 0 | 0 | 1 | 2 |
| 7:45 AM | 0 | 18 | 4 | 2 | 24 | 0 | 18 | 4 | 2 | 24 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 9 | 1 | 0 | 10 | 0 | 9 | 1 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 3 | 1 | 0 | 5 | 1 | 3 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 4 | 3 | 0 | 7 | 0 | 3 | 3 | 0 | 6 | 0 | 1 | 0 | 0 | 1 |
| 8:45 AM | 0 | 2 | 2 | 0 | 4 | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 2 | 44 | 12 | 3 | 61 | 1 | 43 | 12 | 2 | 58 | 1 | 1 | 0 | 1 | 3 |
| 3:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 7 | 5 | 0 | 12 | 0 | 7 | 4 | 0 | 11 | 0 | 0 | 1 | 0 | 1 |
| 4:15 PM | 0 | 5 | 2 | 2 | 9 | 0 | 5 | 2 | 1 | 8 | 0 | 0 | 0 | 1 | 1 |
| 4:30 PM | 0 | 5 | 0 | 0 | 5 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 |
| 4:45 PM | 0 | 2 | 3 | 1 | 6 | 0 | 2 | 2 | 1 | 5 | 0 | 0 | 1 | 0 | 1 |
| 5:00 PM | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 7 | 2 | 2 | 11 | 0 | 7 | 1 | 1 | 9 | 0 | 0 | 1 | 1 | 2 |
| 5:30 PM | 0 | 6 | 1 | 0 | 7 | 0 | 5 | 1 | 0 | 6 | 0 | 1 | 0 | 0 | 1 |
| 5:45 PM | 0 | 4 | 1 | 0 | 5 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 1 |
| TOTAL | 0 | 38 | 14 | 5 | 57 | 0 | 36 | 10 | 3 | 49 | 0 | 2 | 4 | 2 | 8 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| | | | | |
|---|---|---|---|---|
| DATE: 7/17/18 TUESDAY | LOCATION: | Upland | PROJECT #: | SC |
| | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 1:** PASSENGER VEHICLES

**NOTES:**

AM PM MD OTHER OTHER — ▲ N, ◄ W, E ►, S ▼

| | NORTHBOUND Grove | | | SOUTHBOUND Grove | | | EASTBOUND Foothill | | | WESTBOUND Foothill | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 18 | 16 | 7 | 8 | 12 | 2 | 2 | 41 | 19 | 9 | 113 | 10 | 257 |
| 7:15 AM | 25 | 9 | 10 | 12 | 19 | 6 | 0 | 71 | 20 | 11 | 129 | 8 | 320 |
| 7:30 AM | 27 | 13 | 11 | 13 | 25 | 4 | 4 | 76 | 24 | 20 | 173 | 6 | 396 |
| 7:45 AM | 33 | 19 | 9 | 22 | 17 | 1 | 2 | 100 | 36 | 18 | 182 | 3 | 442 |
| 8:00 AM | 38 | 17 | 12 | 13 | 14 | 5 | 1 | 85 | 24 | 16 | 146 | 21 | 392 |
| 8:15 AM | 33 | 17 | 8 | 15 | 22 | 2 | 3 | 78 | 29 | 17 | 140 | 22 | 386 |
| 8:30 AM | 45 | 20 | 14 | 11 | 21 | 4 | 1 | 82 | 28 | 13 | 138 | 15 | 392 |
| 8:45 AM | 42 | 24 | 15 | 15 | 27 | 4 | 1 | 89 | 32 | 20 | 132 | 15 | 416 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 261 | 135 | 86 | 109 | 157 | 28 | 14 | 622 | 212 | 124 | 1,153 | 100 | 3,001 |
| APPROACH % | 54% | 28% | 18% | 37% | 53% | 10% | 2% | 73% | 25% | 9% | 84% | 7% | |
| APP/DEPART | 482 | / | 245 | 294 | / | 493 | 848 | / | 817 | 1,377 | / | 1,446 | 0 |
| BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | |
| VOLUMES | 131 | 66 | 40 | 63 | 78 | 12 | 7 | 339 | 113 | 71 | 641 | 52 | 1,616 |
| APPROACH % | 55% | 28% | 17% | 41% | 51% | 8% | 2% | 73% | 24% | 9% | 84% | 7% | |
| PEAK HR FACTOR | | 0.884 | | | 0.911 | | | 0.837 | | | 0.941 | | 0.914 |
| APP/DEPART | 237 | / | 125 | 153 | / | 262 | 462 | / | 442 | 764 | / | 787 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 40 | 41 | 41 | 34 | 39 | 3 | 3 | 213 | 44 | 19 | 151 | 16 | 644 |
| 4:15 PM | 50 | 38 | 34 | 38 | 40 | 1 | 7 | 206 | 42 | 19 | 137 | 29 | 641 |
| 4:30 PM | 36 | 34 | 46 | 22 | 31 | 2 | 11 | 253 | 46 | 16 | 176 | 25 | 698 |
| 4:45 PM | 49 | 41 | 54 | 39 | 28 | 7 | 2 | 272 | 33 | 23 | 143 | 20 | 711 |
| 5:00 PM | 43 | 37 | 47 | 42 | 37 | 6 | 5 | 293 | 59 | 22 | 179 | 20 | 790 |
| 5:15 PM | 45 | 42 | 39 | 42 | 33 | 4 | 5 | 261 | 55 | 10 | 185 | 20 | 741 |
| 5:30 PM | 49 | 52 | 29 | 37 | 39 | 1 | 6 | 241 | 47 | 10 | 160 | 13 | 684 |
| 5:45 PM | 41 | 42 | 30 | 36 | 31 | 3 | 5 | 253 | 42 | 13 | 184 | 21 | 701 |
| VOLUMES | 353 | 327 | 320 | 290 | 278 | 27 | 44 | 1,992 | 368 | 132 | 1,315 | 164 | 5,610 |
| APPROACH % | 35% | 33% | 32% | 49% | 47% | 5% | 2% | 83% | 15% | 8% | 82% | 10% | |
| APP/DEPART | 1,000 | / | 523 | 595 | / | 775 | 2,404 | / | 2,605 | 1,611 | / | 1,707 | 0 |
| BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | |
| VOLUMES | 173 | 154 | 186 | 145 | 129 | 19 | 18 | 1,079 | 193 | 69 | 683 | 85 | 2,940 |
| APPROACH % | 34% | 30% | 36% | 49% | 44% | 6% | 1% | 83% | 15% | 8% | 81% | 10% | |
| PEAK HR FACTOR | | 0.891 | | | 0.862 | | | 0.907 | | | 0.949 | | 0.930 |
| APP/DEPART | 513 | / | 257 | 293 | / | 391 | 1,295 | / | 1,412 | 839 | / | 880 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 2 | 0 | 2 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 12 | 3 | 15 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 5 | 2 | 3 | 2 |
| 5 | 4 | 3 | 0 |
| 6 | 3 | 4 | 0 |
| 3 | 1 | 7 | 0 |
| 8 | 4 | 3 | 6 |
| 6 | 2 | 6 | 2 |
| 8 | 2 | 8 | 3 |
| 9 | 3 | 8 | 3 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 50 | 21 | 42 | 16 |
| 23 | 10 | 20 | 8 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 21 | 3 | 16 | 3 |
| 10 | 1 | 12 | 5 |
| 26 | 2 | 8 | 3 |
| 21 | 1 | 12 | 5 |
| 12 | 4 | 7 | 7 |
| 9 | 4 | 9 | 4 |
| 19 | 1 | 16 | 3 |
| 12 | 2 | 13 | 6 |
| 130 | 18 | 93 | 36 |
| 68 | 11 | 36 | 19 |

**Grove** (NORTH SIDE)

**Foothill** WEST SIDE — EAST SIDE **Foothill**

SOUTH SIDE **Grove**

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 2:** 2-AXLE WORK VEHICLES/ TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

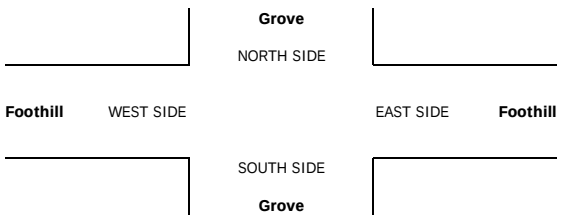
| | | NORTHBOUND (Grove) | | | SOUTHBOUND (Grove) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| AM | 7:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 5 |
| | 7:15 AM | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 1 | 12 |
| | 7:30 AM | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 2 | 1 | 1 | 2 | 2 | 14 |
| | 7:45 AM | 4 | 1 | 1 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 4 | 0 | 16 |
| | 8:00 AM | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 8 | 0 | 1 | 4 | 1 | 18 |
| | 8:15 AM | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 3 | 0 | 4 | 1 | 16 |
| | 8:30 AM | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 4 | 3 | 1 | 2 | 0 | 13 |
| | 8:45 AM | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 7 | 1 | 1 | 6 | 0 | 20 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 9 | 7 | 7 | 4 | 3 | 1 | 2 | 33 | 11 | 4 | 28 | 5 | 114 |
| | APPROACH % | 39% | 30% | 30% | 50% | 38% | 13% | 4% | 72% | 24% | 11% | 76% | 14% | |
| | APP/DEPART | 23 | / | 14 | 8 | / | 17 | 46 | / | 45 | 37 | / | 38 | 0 |
| | BEGIN PEAK HR | | 8:00 AM | | | | | | | | | | | |
| | VOLUMES | 5 | 2 | 3 | 1 | 2 | 0 | 2 | 24 | 7 | 3 | 16 | 2 | 67 |
| | APPROACH % | 50% | 20% | 30% | 33% | 67% | 0% | 6% | 73% | 21% | 14% | 76% | 10% | |
| | PEAK HR FACTOR | | 0.833 | | | 0.375 | | | 0.917 | | | 0.750 | | 0.838 |
| | APP/DEPART | 10 | / | 6 | 3 | / | 12 | 33 | / | 28 | 21 | / | 21 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 10 |
| | 4:15 PM | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 4 | 2 | 1 | 3 | 0 | 15 |
| | 4:30 PM | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 2 | 1 | 2 | 1 | 14 |
| | 4:45 PM | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 9 | 2 | 0 | 2 | 0 | 16 |
| | 5:00 PM | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 2 | 1 | 4 | 1 | 15 |
| | 5:15 PM | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 2 | 0 | 2 | 0 | 13 |
| | 5:30 PM | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 9 |
| | 5:45 PM | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 4 | 2 | 1 | 4 | 0 | 16 |
| | VOLUMES | 11 | 4 | 7 | 2 | 7 | 0 | 1 | 36 | 13 | 6 | 19 | 2 | 108 |
| | APPROACH % | 50% | 18% | 32% | 22% | 78% | 0% | 2% | 72% | 26% | 22% | 70% | 7% | |
| | APP/DEPART | 22 | / | 7 | 9 | / | 26 | 50 | / | 45 | 27 | / | 30 | 0 |
| | BEGIN PEAK HR | | 4:15 PM | | | | | | | | | | | |
| | VOLUMES | 4 | 1 | 5 | 1 | 5 | 0 | 1 | 19 | 8 | 3 | 11 | 2 | 60 |
| | APPROACH % | 40% | 10% | 50% | 17% | 83% | 0% | 4% | 68% | 29% | 19% | 69% | 13% | |
| | PEAK HR FACTOR | | 0.625 | | | 0.750 | | | 0.636 | | | 0.667 | | 0.938 |
| | APP/DEPART | 10 | / | 4 | 6 | / | 16 | 28 | / | 25 | 16 | / | 15 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| | | | | |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 2 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 5 | 1 | 1 | 0 |
| | | | |
| 2 | 0 | 0 | 0 |
| | | | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 2 | 0 | 4 | 0 |
| | | | |
| 2 | 0 | 3 | 0 |



# INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 3:** 3-AXLE TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

| | NORTHBOUND (Grove) | | | SOUTHBOUND (Grove) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 7:45 AM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| 8:45 AM | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 2 | 2 | 3 | 1 | 0 | 0 | 0 | 4 | 2 | 0 | 4 | 3 | 21 |
| APPROACH % | 29% | 29% | 43% | 100% | 0% | 0% | 0% | 67% | 33% | 0% | 57% | 43% | |
| APP/DEPART | 7 | / | 5 | 1 | / | 2 | 6 | / | 8 | 7 | / | 6 | 0 |
| BEGIN PEAK HR | | 7:00 AM | | | | | | | | | | | |
| VOLUMES | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 11 |
| APPROACH % | 50% | 50% | 0% | 0% | 0% | 0% | 0% | 50% | 50% | 0% | 33% | 67% | |
| PEAK HR FACTOR | | 0.500 | | | 0.000 | | | 0.500 | | | 0.375 | | 0.917 |
| APP/DEPART | 4 | / | 4 | 0 | / | 2 | 4 | / | 2 | 3 | / | 3 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 3 |
| 4:30 PM | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 4 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| VOLUMES | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 5 | 4 | 1 | 3 | 0 | 18 |
| APPROACH % | 0% | 0% | 100% | 75% | 25% | 0% | 0% | 56% | 44% | 25% | 75% | 0% | |
| APP/DEPART | 1 | / | 0 | 4 | / | 6 | 9 | / | 9 | 4 | / | 3 | 0 |
| BEGIN PEAK HR | | 4:00 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 3 | 3 | 1 | 1 | 0 | 13 |
| APPROACH % | 0% | 0% | 100% | 75% | 25% | 0% | 0% | 50% | 50% | 50% | 50% | 0% | |
| PEAK HR FACTOR | | 0.250 | | | 0.500 | | | 0.750 | | | 0.500 | | 0.813 |
| APP/DEPART | 1 | / | 0 | 4 | / | 5 | 6 | / | 7 | 2 | / | 1 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 1 |

| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| 1 | 0 | 0 | 0 |

**Grove**

NORTH SIDE

**Foothill** WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

**Grove**

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 4:** 4 OR MORE AXLE TRUCKS

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

| | NORTHBOUND (Grove) | | | SOUTHBOUND (Grove) | | | EASTBOUND (Foothill) | | | WESTBOUND (Foothill) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 7:15 AM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 4 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 7:45 AM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 6 |
| 8:00 AM | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 6 |
| 8:15 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:30 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 5 |
| 8:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 8 | 1 | 1 | 0 | 0 | 0 | 1 | 11 | 3 | 1 | 4 | 0 | 30 |
| APPROACH % | 80% | 10% | 10% | 0% | 0% | 0% | 7% | 73% | 20% | 20% | 80% | 0% | |
| APP/DEPART | 10 | / | 2 | 0 | / | 4 | 15 | / | 12 | 5 | / | 12 | 0 |
| BEGIN PEAK HR | | 7:15 AM | | | | | | | | | | | |
| VOLUMES | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 3 | 1 | 3 | 0 | 18 |
| APPROACH % | 100% | 0% | 0% | 0% | 0% | 0% | 11% | 56% | 33% | 25% | 75% | 0% | |
| PEAK HR FACTOR | | 0.625 | | | 0.000 | | | 0.750 | | | 0.500 | | 0.750 |
| APP/DEPART | 5 | / | 1 | 0 | / | 4 | 9 | / | 5 | 4 | / | 8 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 5 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 |
| VOLUMES | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 3 | 0 | 9 |
| APPROACH % | 100% | 0% | 0% | 0% | 50% | 50% | 0% | 67% | 33% | 0% | 100% | 0% | |
| APP/DEPART | 1 | / | 0 | 2 | / | 2 | 3 | / | 2 | 3 | / | 5 | 0 |
| BEGIN PEAK HR | | 4:00 PM | | | | | | | | | | | |
| VOLUMES | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 6 |
| APPROACH % | 100% | 0% | 0% | 0% | 0% | 100% | 0% | 67% | 33% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.250 | | | 0.250 | | | 0.375 | | | 0.250 | | 0.300 |
| APP/DEPART | 1 | / | 0 | 1 | / | 1 | 3 | / | 2 | 1 | / | 3 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

# INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

**CLASS 5:** RV

**NOTES:**

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

| | | NORTHBOUND Grove | | | SOUTHBOUND Grove | | | EASTBOUND Foothill | | | WESTBOUND Foothill | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| | APP/DEPART | 0 | / | 0 | 0 | / | 0 | 1 | / | 1 | 1 | / | 1 | 0 |
| | BEGIN PEAK HR | | 7:00 AM | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | |
| | PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.250 | | | 0.250 | | 0.500 |
| | APP/DEPART | 0 | / | 0 | 0 | / | 0 | 1 | / | 1 | 1 | / | 1 | 0 |
| PM | 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| | APP/DEPART | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 |
| | BEGIN PEAK HR | | 3:00 PM | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | |
| | PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.000 | | | 0.000 | | 0.000 |
| | APP/DEPART | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 | / | 0 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

## INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

| DATE: | LOCATION: | Upland | PROJECT #: | SC |
|---|---|---|---|---|
| 7/17/18 | NORTH & SOUTH: | Grove | LOCATION #: | 6 |
| TUESDAY | EAST & WEST: | Foothill | CONTROL: | SIGNAL |

| CLASS 6: | NOTES: |
|---|---|
| BUSES | |

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

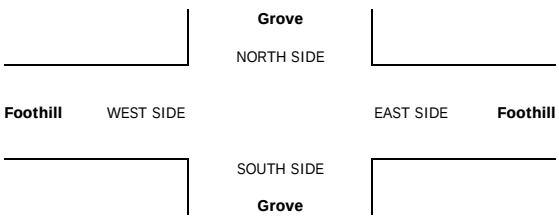
| | NORTHBOUND Grove | | | SOUTHBOUND Grove | | | EASTBOUND Foothill | | | WESTBOUND Foothill | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 1 | NT 1 | NR 1 | SL 1 | ST 2 | SR 1 | EL 1 | ET 2 | ER 1 | WL 1 | WT 2 | WR 0 | TOTAL |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 3 |
| 7:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 4 |
| 8:00 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 5 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 8:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 |
| 8:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VOLUMES | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 9 | 2 | 0 | 9 | 1 | 26 |
| APPROACH % | 50% | 50% | 0% | 33% | 67% | 0% | 0% | 82% | 18% | 0% | 90% | 10% | |
| APP/DEPART | 2 | / | 2 | 3 | / | 4 | 11 | / | 10 | 10 | / | 10 | 0 |
| BEGIN PEAK HR | | 7:45 AM | | | | | | | | | | | |
| VOLUMES | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 5 | 1 | 0 | 4 | 1 | 15 |
| APPROACH % | 50% | 50% | 0% | 50% | 50% | 0% | 0% | 83% | 17% | 0% | 80% | 20% | |
| PEAK HR FACTOR | | 0.500 | | | 0.500 | | | 0.750 | | | 0.625 | | 0.750 |
| APP/DEPART | 2 | / | 2 | 2 | / | 2 | 6 | / | 6 | 5 | / | 5 | 0 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 4:30 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 1 | 0 | 6 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 4 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 |
| VOLUMES | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 8 | 4 | 1 | 9 | 0 | 24 |
| APPROACH % | 0% | 100% | 0% | 0% | 0% | 100% | 0% | 67% | 33% | 10% | 90% | 0% | |
| APP/DEPART | 1 | / | 1 | 1 | / | 5 | 12 | / | 8 | 10 | / | 10 | 0 |
| BEGIN PEAK HR | | 4:45 PM | | | | | | | | | | | |
| VOLUMES | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 4 | 0 | 4 | 0 | 14 |
| APPROACH % | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 56% | 44% | 0% | 100% | 0% | |
| PEAK HR FACTOR | | 0.000 | | | 0.250 | | | 0.563 | | | 1.000 | | 0.583 |
| APP/DEPART | 0 | / | 0 | 1 | / | 4 | 9 | / | 5 | 4 | / | 5 | 0 |

**U-TURNS**

| NB | SB | EB | WB | TTL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

**RTOR**

| NRR | SRR | ERR | WRR |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |



# APPENDIX 3.2:

## TRIP GENERATION AND TRIP DISTRIBUTION PATTERNS FOR LOCAL SCHOOLS

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**Table 3.2-1**

**Existing School Trip Generation Summary**

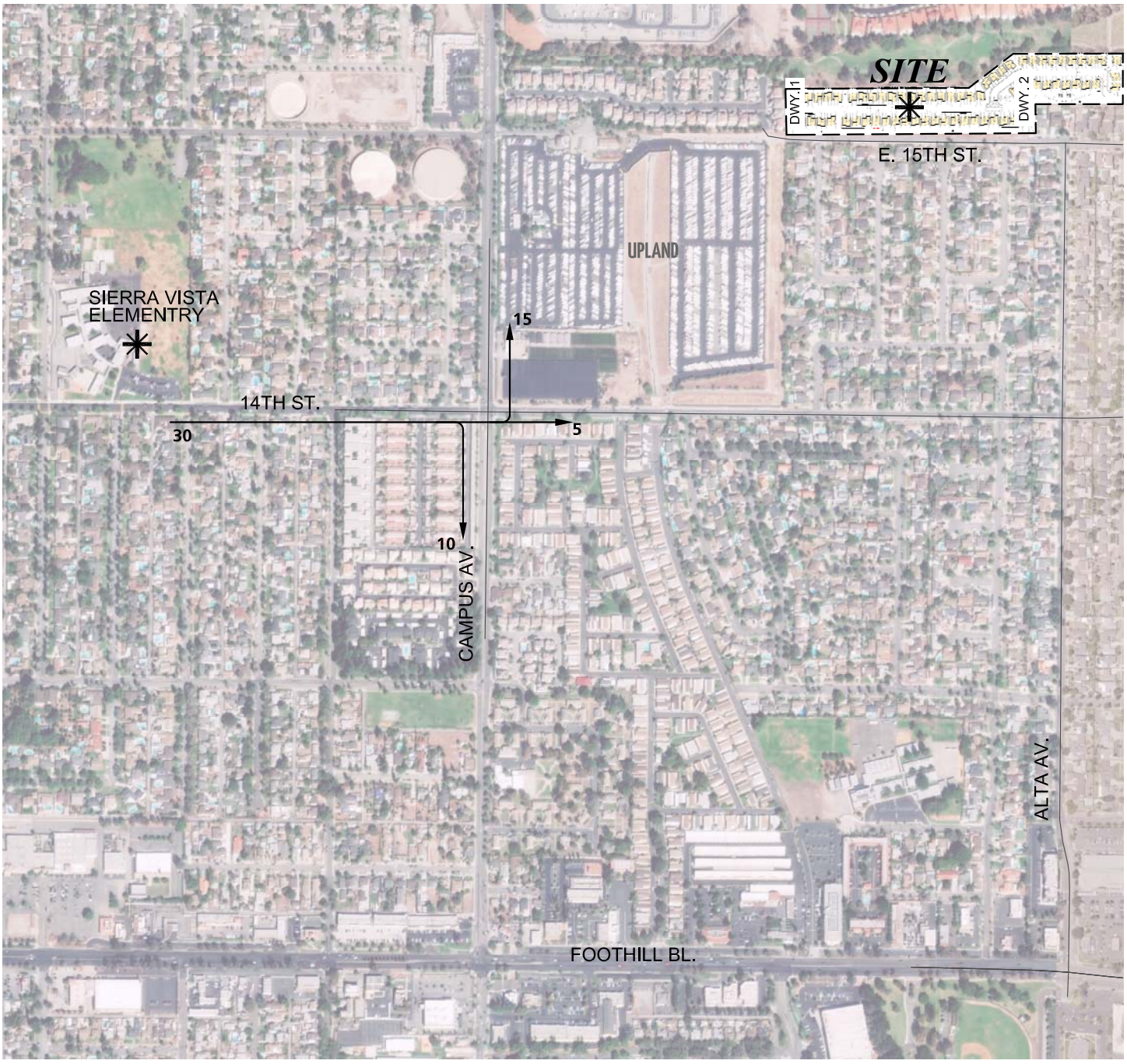
| Land Use | ITE LU Code | Units[2] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| **Trip Generation Rates[1]** | | | | | | | | | |
| Elementary School | 520 | STU | 0.36 | 0.31 | 0.67 | 0.08 | 0.09 | 0.17 | 1.89 |
| Middle/Junior High School | 522 | STU | 0.31 | 0.27 | 0.58 | 0.08 | 0.09 | 0.17 | 2.13 |
| High School | 530 | STU | 0.35 | 0.17 | 0.52 | 0.07 | 0.07 | 0.14 | 2.03 |

| School | Quantity | Units[2] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| **Trip Generation Summary** | | | | | | | | | |
| ***Sierra Vista Elementary School*** | | | | | | | | | |
| | 424 | STU | 153 | 131 | 284 | 35 | 37 | 72 | 801 |
| ***Valle Vista Elementary School*** | | | | | | | | | |
| | 480 | STU | 174 | 148 | 322 | 39 | 42 | 81 | 907 |
| ***Foothill Knolls (K-8)*** | | | | | | | | | |
| *Elementary School:* | 503 | STU | 182 | 155 | 337 | 41 | 44 | 85 | 951 |
| *Junior High School:* | 84 | STU | 26 | 22 | 48 | 7 | 7 | 14 | 179 |
| *Subtotal:* | | | 208 | 177 | 385 | 48 | 51 | 99 | 1,130 |
| ***Upland Junior High School*** | | | | | | | | | |
| | 752 | STU | 236 | 201 | 437 | 63 | 65 | 128 | 1,602 |
| ***Upland High School*** | | | | | | | | | |
| | 3,313 | STU | 1,154 | 569 | 1,723 | 223 | 241 | 464 | 6,725 |
| ***Alta Loma High School*** | | | | | | | | | |
| | 2,475 | STU | 862 | 425 | 1,287 | 166 | 180 | 346 | 5,024 |
| ***TOTAL NET TRIPS*** | | | ***2,787*** | ***1,651*** | ***4,438*** | ***574*** | ***616*** | ***1,190*** | ***16,189*** |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] STU = Students

**EXHIBIT 3.2-1**

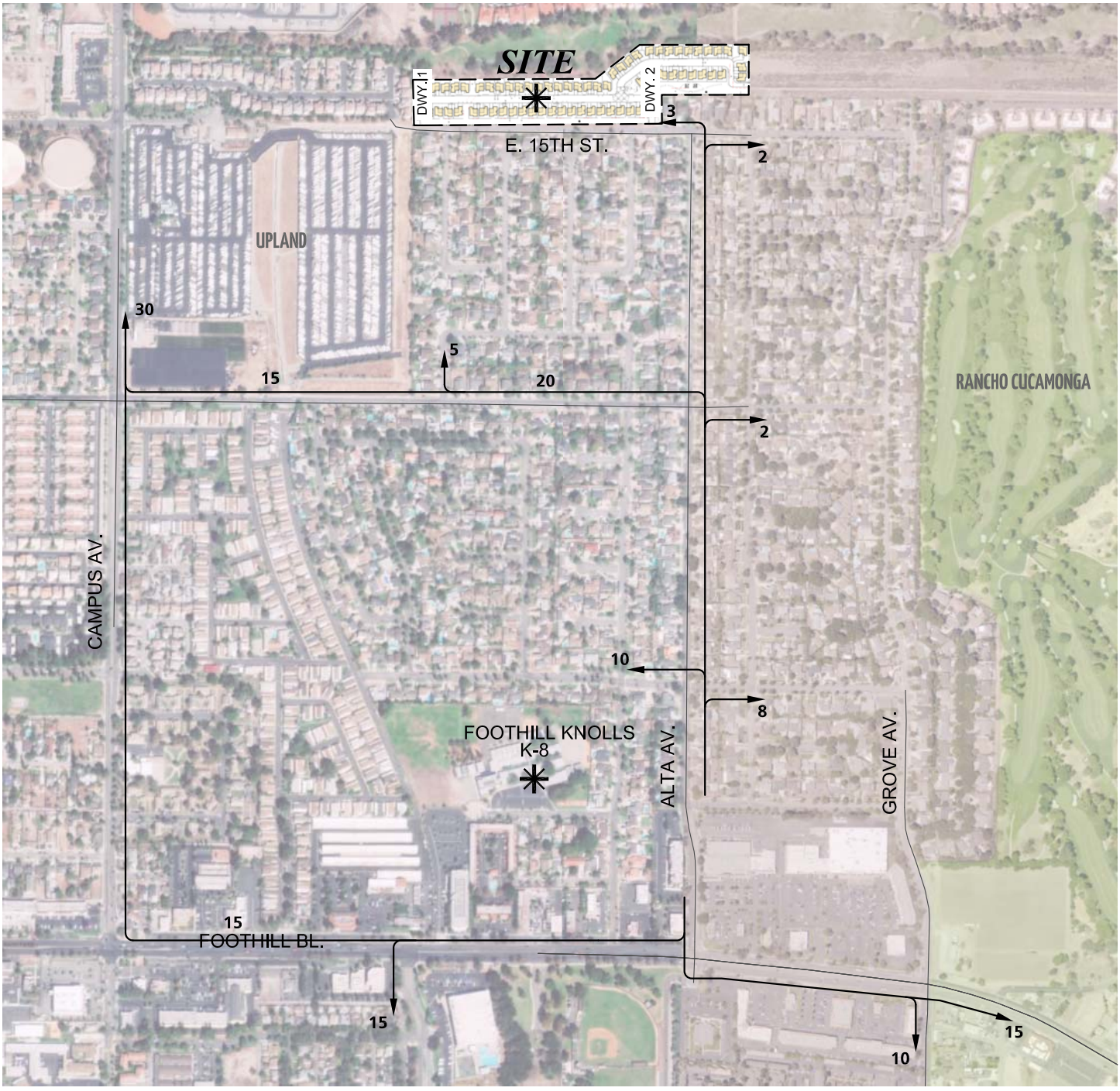



**LEGEND:**

10 = PERCENT TO/FROM SCHOOL

N

**EXHIBIT 3.2-2**




**LEGEND:**

10 = PERCENT TO/FROM SCHOOL

N

*11822 - trip_int.dwg*

URBAN CROSSROADS

**EXHIBIT 3.2-3**



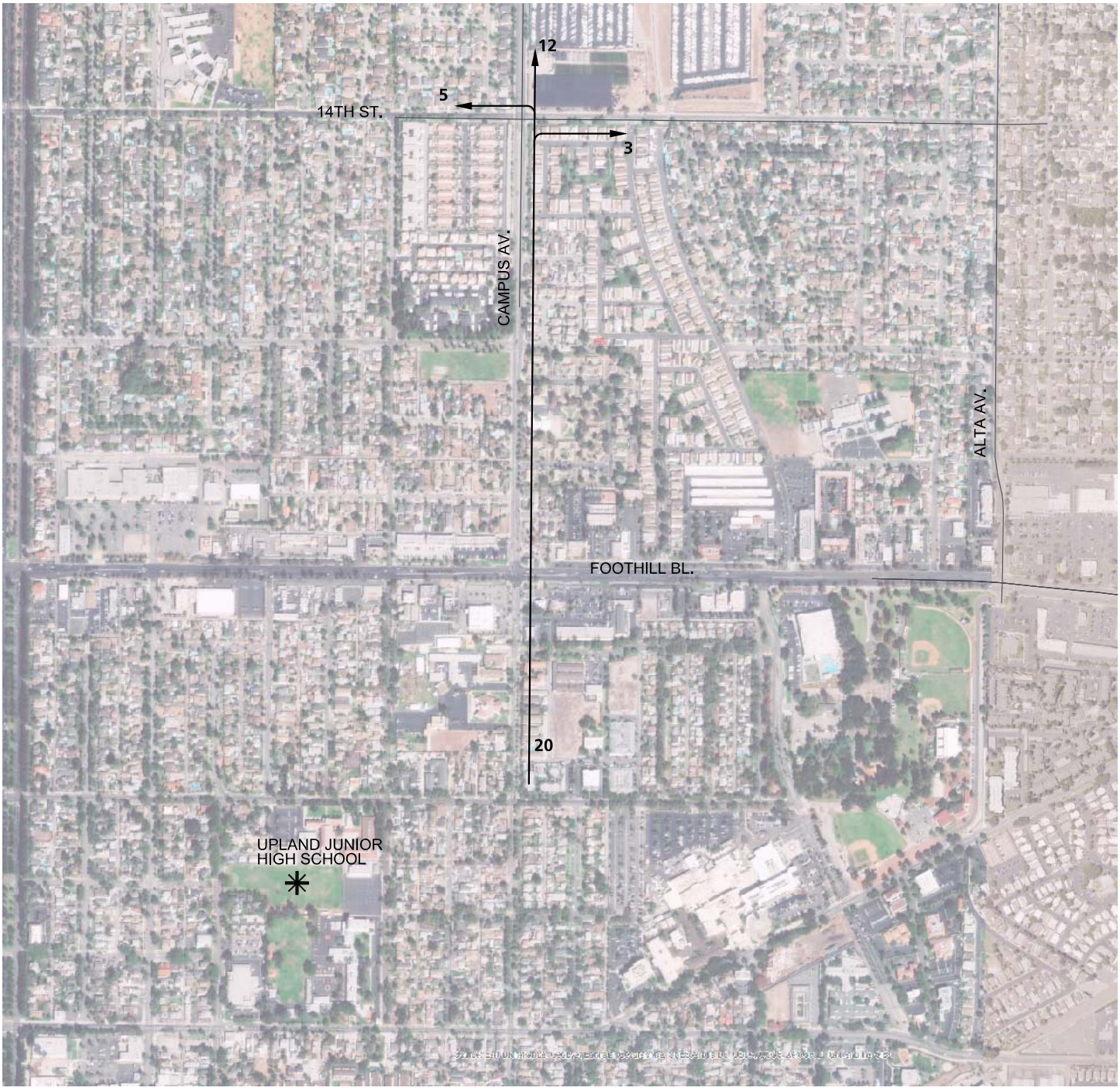

**LEGEND:**

10 = PERCENT TO/FROM SCHOOL

N

*11822 - trip_int.dwg*

## EXHIBIT 3.2-4




**LEGEND:**

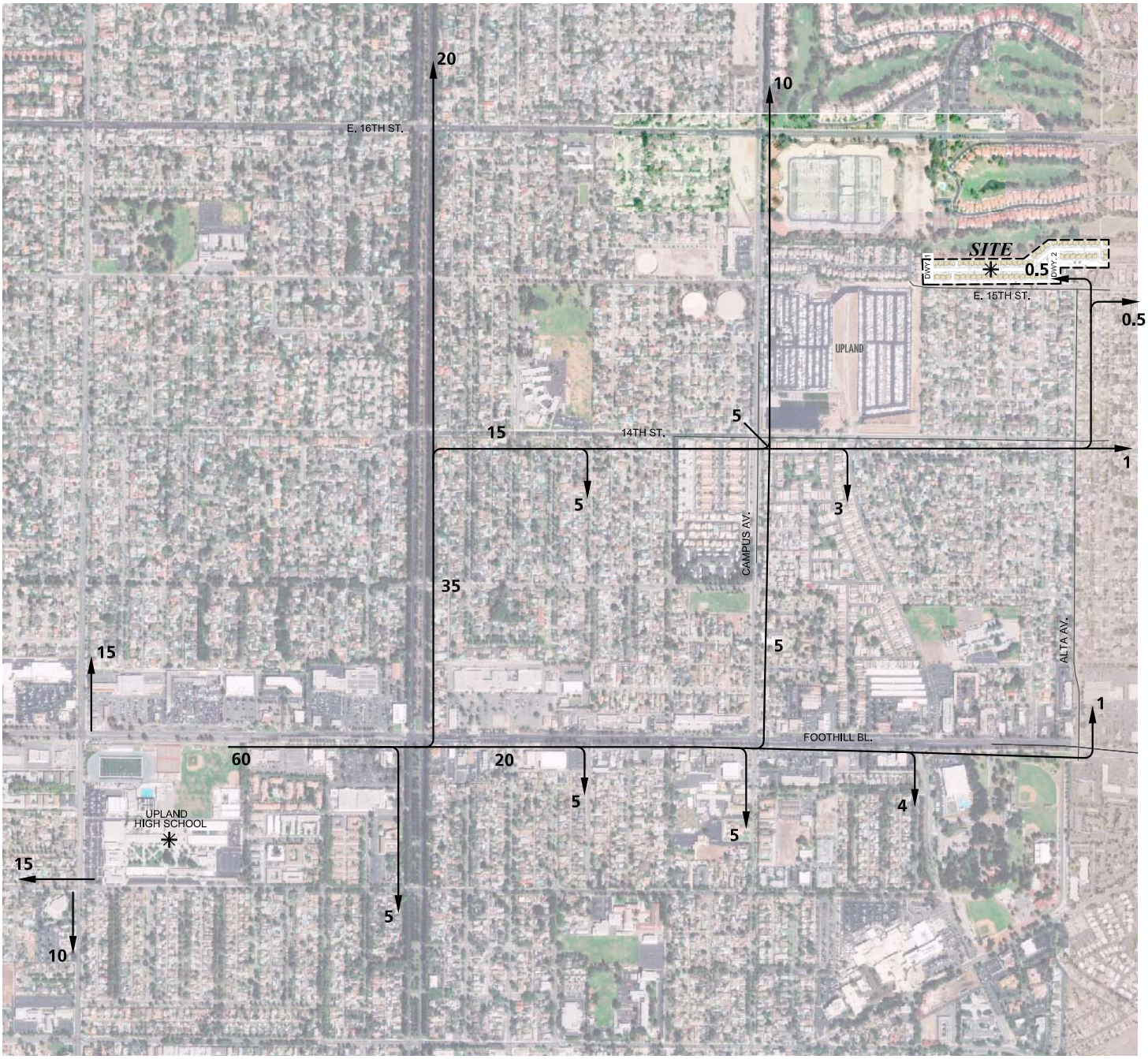
10 = PERCENT TO/FROM SCHOOL

N

*11822 - trip_int.dwg*

URBAN CROSSROADS

## EXHIBIT 3.2-5

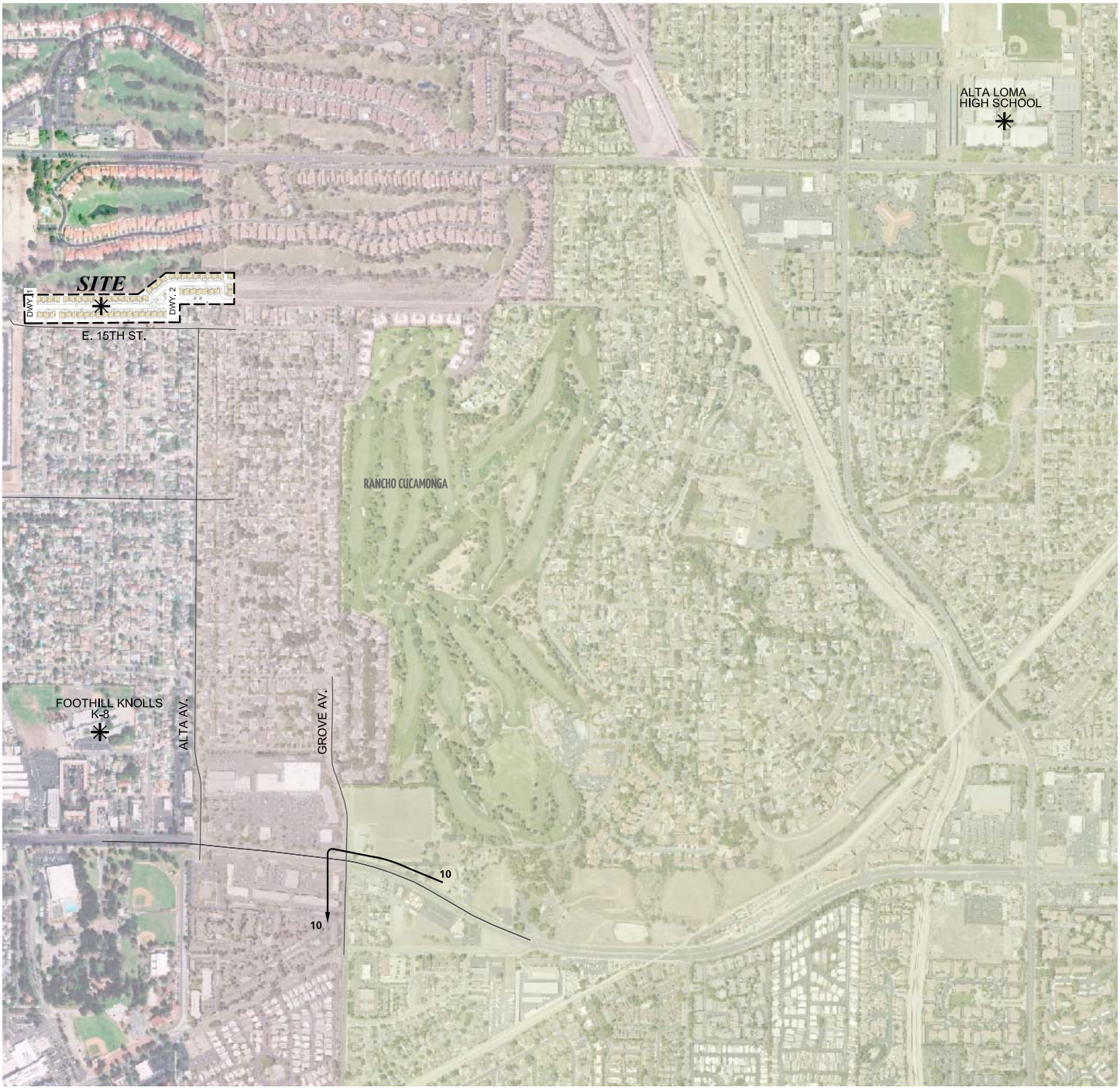



**LEGEND:**

10 = PERCENT TO/FROM SCHOOL

N

**EXHIBIT 3.2-6**




## LEGEND:

10 = PERCENT TO/FROM SCHOOL

N

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# APPENDIX 3.3:

# EXISTING (2018) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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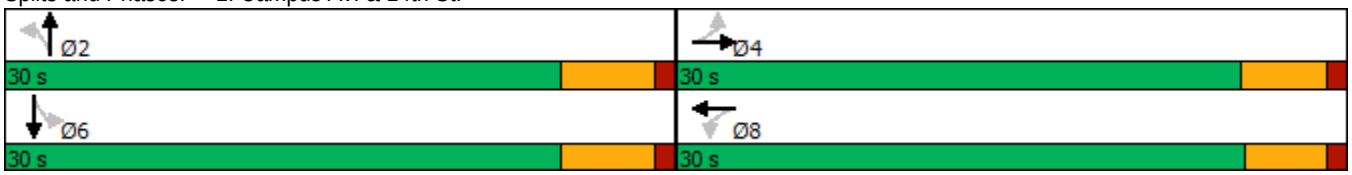
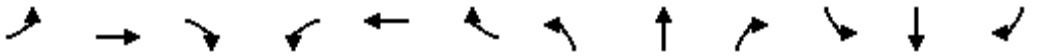
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 73 | 65 | 38 | 129 | 32 | 413 | 111 | 588 |
| Future Volume (vph) | 73 | 65 | 38 | 129 | 32 | 413 | 111 | 588 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 39.6 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 73 | 65 | 40 | 38 | 129 | 132 | 32 | 413 | 25 | 111 | 588 | 98 |
| Future Volume (veh/h) | 73 | 65 | 40 | 38 | 129 | 132 | 32 | 413 | 25 | 111 | 588 | 98 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.98 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 84 | 75 | 40 | 44 | 148 | 118 | 37 | 475 | 24 | 128 | 676 | 111 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 420 | 365 | 195 | 543 | 309 | 247 | 359 | 1381 | 70 | 474 | 1226 | 201 |
| Arrive On Green | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Sat Flow, veh/h | 1113 | 1138 | 607 | 1256 | 963 | 768 | 688 | 3442 | 174 | 898 | 3055 | 501 |
| Grp Volume(v), veh/h | 84 | 0 | 115 | 44 | 0 | 266 | 37 | 245 | 254 | 128 | 393 | 394 |
| Grp Sat Flow(s),veh/h/ln | 1113 | 0 | 1745 | 1256 | 0 | 1731 | 688 | 1777 | 1839 | 898 | 1777 | 1779 |
| Q Serve(g_s), s | 2.4 | 0.0 | 1.7 | 1.0 | 0.0 | 4.4 | 1.6 | 3.4 | 3.5 | 4.2 | 6.1 | 6.1 |
| Cycle Q Clear(g_c), s | 6.8 | 0.0 | 1.7 | 2.7 | 0.0 | 4.4 | 7.7 | 3.4 | 3.5 | 7.6 | 6.1 | 6.1 |
| Prop In Lane | 1.00 | | 0.35 | 1.00 | | 0.44 | 1.00 | | 0.09 | 1.00 | | 0.28 |
| Lane Grp Cap(c), veh/h | 420 | 0 | 560 | 543 | 0 | 556 | 359 | 713 | 738 | 474 | 713 | 714 |
| V/C Ratio(X) | 0.20 | 0.00 | 0.21 | 0.08 | 0.00 | 0.48 | 0.10 | 0.34 | 0.34 | 0.27 | 0.55 | 0.55 |
| Avail Cap(c_a), veh/h | 842 | 0 | 1222 | 1026 | 0 | 1222 | 557 | 1224 | 1267 | 733 | 1224 | 1226 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.5 | 0.0 | 8.9 | 9.9 | 0.0 | 9.8 | 11.3 | 7.5 | 7.5 | 10.1 | 8.3 | 8.3 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.6 | 0.1 | 0.3 | 0.3 | 0.3 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 0.5 | 0.2 | 0.0 | 1.4 | 0.2 | 0.8 | 0.8 | 0.6 | 1.5 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 12.8 | 0.0 | 9.1 | 9.9 | 0.0 | 10.4 | 11.4 | 7.8 | 7.8 | 10.4 | 9.0 | 9.0 |
| LnGrp LOS | B | A | A | A | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 199 | | | 310 | | | 536 | | | 915 | |
| Approach Delay, s/veh | | 10.6 | | | 10.4 | | | 8.0 | | | 9.2 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 19.6 | | 16.4 | | 19.6 | | 16.4 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 9.7 | | 8.8 | | 9.6 | | 6.4 | | | | |
| Green Ext Time (p_c), s | | 2.7 | | 0.8 | | 4.8 | | 1.7 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 9.2 |
| HCM 6th LOS | | A |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 14 | 18 | 4 | 9 | 13 |
| Future Vol, veh/h | 3 | 14 | 18 | 4 | 9 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 20 | 26 | 6 | 13 | 19 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 24 | 0 | 72 | 15 |
| Stage 1 | - | - | - | - | 14 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1591 | - | 932 | 1065 |
| Stage 1 | - | - | - | - | 1009 | - |
| Stage 2 | - | - | - | - | 965 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1591 | - | 917 | 1064 |
| Mov Cap-2 Maneuver | - | - | - | - | 917 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 965 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 6 | 8.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 999 | - | - | 1591 | - |
| HCM Lane V/C Ratio | 0.032 | - | - | 0.016 | - |
| HCM Control Delay (s) | 8.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 11 | 63 | 65 | 7 | 90 | 2 | 57 | 12 | 4 | 3 | 11 | 28 |
| Future Vol, veh/h | 11 | 63 | 65 | 7 | 90 | 2 | 57 | 12 | 4 | 3 | 11 | 28 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 14 | 81 | 83 | 9 | 115 | 3 | 73 | 15 | 5 | 4 | 14 | 36 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 120 | 0 | 0 | 185 | 0 | 0 | 333 | 310 | 148 | 302 | 350 | 120 |
| Stage 1 | - | - | - | - | - | - | 172 | 172 | - | 137 | 137 | - |
| Stage 2 | - | - | - | - | - | - | 161 | 138 | - | 165 | 213 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1468 | - | - | 1390 | - | - | 620 | 605 | 899 | 650 | 574 | 931 |
| Stage 1 | - | - | - | - | - | - | 830 | 756 | - | 866 | 783 | - |
| Stage 2 | - | - | - | - | - | - | 841 | 782 | - | 837 | 726 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1465 | - | - | 1362 | - | - | 564 | 581 | 878 | 621 | 552 | 928 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 564 | 581 | - | 621 | 552 | - |
| Stage 1 | - | - | - | - | - | - | 804 | 733 | - | 855 | 776 | - |
| Stage 2 | - | - | - | - | - | - | 787 | 775 | - | 803 | 703 | - |

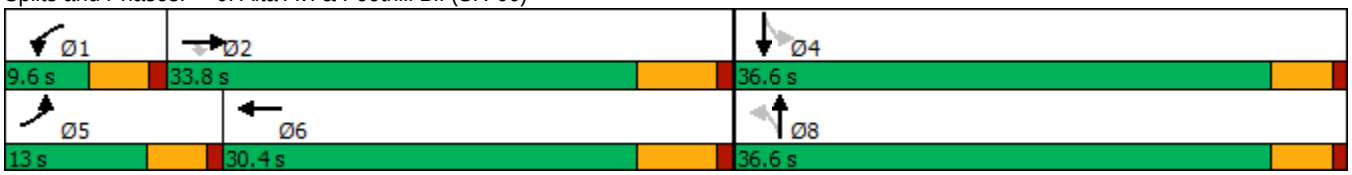
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0.5 | 12.4 | 10.1 |
| HCM LOS | | | B | B |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 578 | 1465 | - | - | 1362 | - | - | 765 |
| HCM Lane V/C Ratio | 0.162 | 0.01 | - | - | 0.007 | - | - | 0.07 |
| HCM Control Delay (s) | 12.4 | 7.5 | 0 | - | 7.7 | 0 | - | 10.1 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.6 | 0 | - | - | 0 | - | - | 0.2 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 125 | 524 | 20 | 13 | 731 | 11 | 6 | 67 | 8 |
| Future Volume (vph) | 125 | 524 | 20 | 13 | 731 | 11 | 6 | 67 | 8 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 58.6 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 125 | 524 | 20 | 13 | 731 | 97 | 11 | 6 | 5 | 67 | 8 | 100 |
| Future Volume (veh/h) | 125 | 524 | 20 | 13 | 731 | 97 | 11 | 6 | 5 | 67 | 8 | 100 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 140 | 589 | 19 | 15 | 821 | 100 | 12 | 7 | 4 | 75 | 9 | 91 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 180 | 1567 | 678 | 34 | 1144 | 139 | 250 | 135 | 57 | 489 | 33 | 329 |
| Arrive On Green | 0.10 | 0.44 | 0.44 | 0.02 | 0.36 | 0.36 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3186 | 388 | 595 | 592 | 250 | 1397 | 142 | 1440 |
| Grp Volume(v), veh/h | 140 | 589 | 19 | 15 | 458 | 463 | 23 | 0 | 0 | 75 | 0 | 100 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1797 | 1437 | 0 | 0 | 1397 | 0 | 1582 |
| Q Serve(g_s), s | 3.7 | 5.4 | 0.3 | 0.4 | 10.7 | 10.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 |
| Cycle Q Clear(g_c), s | 3.7 | 5.4 | 0.3 | 0.4 | 10.7 | 10.7 | 2.5 | 0.0 | 0.0 | 1.6 | 0.0 | 2.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.22 | 0.52 | | 0.17 | 1.00 | | 0.91 |
| Lane Grp Cap(c), veh/h | 180 | 1567 | 678 | 34 | 638 | 645 | 443 | 0 | 0 | 489 | 0 | 362 |
| V/C Ratio(X) | 0.78 | 0.38 | 0.03 | 0.45 | 0.72 | 0.72 | 0.05 | 0.00 | 0.00 | 0.15 | 0.00 | 0.28 |
| Avail Cap(c_a), veh/h | 311 | 2065 | 893 | 185 | 907 | 917 | 1085 | 0 | 0 | 1097 | 0 | 1051 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.1 | 9.0 | 7.6 | 23.4 | 13.3 | 13.3 | 14.5 | 0.0 | 0.0 | 15.0 | 0.0 | 15.3 |
| Incr Delay (d2), s/veh | 2.8 | 0.1 | 0.0 | 3.4 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 1.4 | 0.1 | 0.2 | 3.4 | 3.4 | 0.2 | 0.0 | 0.0 | 0.6 | 0.0 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.9 | 9.2 | 7.6 | 26.8 | 14.9 | 14.9 | 14.5 | 0.0 | 0.0 | 15.0 | 0.0 | 15.4 |
| LnGrp LOS | C | A | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 748 | | | 936 | | | 23 | | | 175 | |
| Approach Delay, s/veh | | 11.9 | | | 15.1 | | | 14.5 | | | 15.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.5 | 27.1 | | 15.6 | 9.5 | 23.1 | | 15.6 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.4 | 7.4 | | 4.5 | 5.7 | 12.7 | | 4.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.6 | | 0.5 | 0.0 | 4.2 | | 0.0 | | | | |

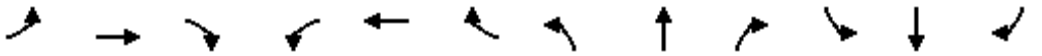
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 13.8 | |
| HCM 6th LOS | | B | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 398 | 139 | 130 | 696 | 165 | 69 | 150 | 67 | 80 | 13 |
| Future Volume (vph) | 12 | 398 | 139 | 130 | 696 | 165 | 69 | 150 | 67 | 80 | 13 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 100 |
| Actuated Cycle Length: 53.7 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 398 | 139 | 130 | 696 | 57 | 165 | 69 | 150 | 67 | 80 | 13 |
| Future Volume (veh/h) | 12 | 398 | 139 | 130 | 696 | 57 | 165 | 69 | 150 | 67 | 80 | 13 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 13 | 437 | 129 | 143 | 765 | 54 | 181 | 76 | 135 | 74 | 88 | 2 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 30 | 944 | 418 | 186 | 1188 | 84 | 527 | 589 | 492 | 484 | 1119 | 483 |
| Arrive On Green | 0.02 | 0.27 | 0.27 | 0.10 | 0.35 | 0.35 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1781 | 3554 | 1573 | 1781 | 3361 | 237 | 1271 | 1870 | 1563 | 1170 | 3554 | 1535 |
| Grp Volume(v), veh/h | 13 | 437 | 129 | 143 | 404 | 415 | 181 | 76 | 135 | 74 | 88 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1573 | 1781 | 1777 | 1821 | 1271 | 1870 | 1563 | 1170 | 1777 | 1535 |
| Q Serve(g_s), s | 0.3 | 5.0 | 3.2 | 3.8 | 9.2 | 9.2 | 5.6 | 1.4 | 3.1 | 2.3 | 0.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.3 | 5.0 | 3.2 | 3.8 | 9.2 | 9.2 | 6.5 | 1.4 | 3.1 | 3.7 | 0.8 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.13 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 30 | 944 | 418 | 186 | 628 | 644 | 527 | 589 | 492 | 484 | 1119 | 483 |
| V/C Ratio(X) | 0.44 | 0.46 | 0.31 | 0.77 | 0.64 | 0.64 | 0.34 | 0.13 | 0.27 | 0.15 | 0.08 | 0.00 |
| Avail Cap(c_a), veh/h | 273 | 2004 | 887 | 753 | 1481 | 1518 | 1108 | 1443 | 1206 | 1020 | 2748 | 1187 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.5 | 14.8 | 14.2 | 21.0 | 13.0 | 13.1 | 13.9 | 11.8 | 12.4 | 13.1 | 11.6 | 11.3 |
| Incr Delay (d2), s/veh | 3.8 | 0.4 | 0.4 | 2.5 | 1.1 | 1.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 1.6 | 0.9 | 1.4 | 2.9 | 2.9 | 1.3 | 0.5 | 0.9 | 0.5 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.3 | 15.2 | 14.6 | 23.5 | 14.2 | 14.1 | 14.0 | 11.8 | 12.5 | 13.2 | 11.6 | 11.3 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 579 | | | 962 | | | 392 | | | 164 | |
| Approach Delay, s/veh | | 15.3 | | | 15.5 | | | 13.1 | | | 12.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 18.6 | | 20.0 | 5.4 | 22.8 | | 20.0 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.8 | 7.0 | | 5.7 | 2.3 | 11.2 | | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.9 | | 0.5 | 0.0 | 5.0 | | 0.7 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 14.8 |
| HCM 6th LOS | B |

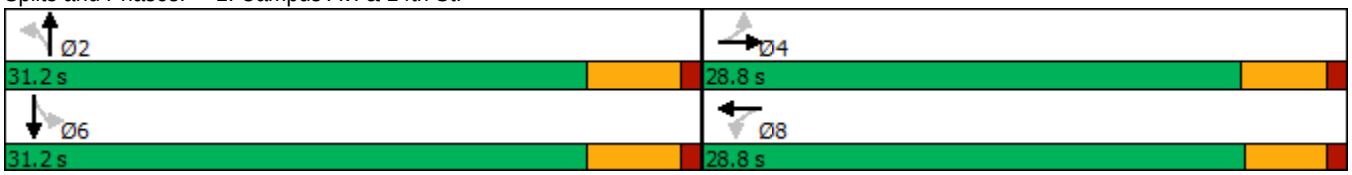
Notes

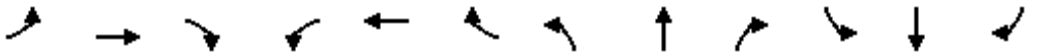
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 93 | 121 | 34 | 73 | 25 | 764 | 133 | 535 |
| Future Volume (vph) | 93 | 121 | 34 | 73 | 25 | 764 | 133 | 535 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 42.4 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 93 | 121 | 20 | 34 | 73 | 109 | 25 | 764 | 51 | 133 | 535 | 56 |
| Future Volume (veh/h) | 93 | 121 | 20 | 34 | 73 | 109 | 25 | 764 | 51 | 133 | 535 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 99 | 129 | 15 | 36 | 78 | 86 | 27 | 813 | 45 | 141 | 569 | 56 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 403 | 426 | 49 | 426 | 211 | 232 | 485 | 1666 | 92 | 393 | 1593 | 156 |
| Arrive On Green | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 |
| Sat Flow, veh/h | 1222 | 1641 | 191 | 1240 | 813 | 896 | 800 | 3419 | 189 | 644 | 3268 | 321 |
| Grp Volume(v), veh/h | 99 | 0 | 144 | 36 | 0 | 164 | 27 | 422 | 436 | 141 | 309 | 316 |
| Grp Sat Flow(s),veh/h/ln | 1222 | 0 | 1832 | 1240 | 0 | 1709 | 800 | 1777 | 1832 | 644 | 1777 | 1812 |
| Q Serve(g_s), s | 2.9 | 0.0 | 2.5 | 0.9 | 0.0 | 3.1 | 0.9 | 6.3 | 6.3 | 7.4 | 4.3 | 4.3 |
| Cycle Q Clear(g_c), s | 6.0 | 0.0 | 2.5 | 3.4 | 0.0 | 3.1 | 5.1 | 6.3 | 6.3 | 13.8 | 4.3 | 4.3 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.52 | 1.00 | | 0.10 | 1.00 | | 0.18 |
| Lane Grp Cap(c), veh/h | 403 | 0 | 475 | 426 | 0 | 443 | 485 | 866 | 893 | 393 | 866 | 883 |
| V/C Ratio(X) | 0.25 | 0.00 | 0.30 | 0.08 | 0.00 | 0.37 | 0.06 | 0.49 | 0.49 | 0.36 | 0.36 | 0.36 |
| Avail Cap(c_a), veh/h | 829 | 0 | 1114 | 864 | 0 | 1048 | 623 | 1171 | 1207 | 504 | 1171 | 1194 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.4 | 0.0 | 11.7 | 13.1 | 0.0 | 12.0 | 7.9 | 6.8 | 6.8 | 11.4 | 6.3 | 6.3 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.4 | 0.1 | 0.0 | 0.5 | 0.0 | 0.4 | 0.4 | 0.6 | 0.2 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.8 | 0.2 | 0.0 | 1.1 | 0.1 | 1.4 | 1.4 | 0.8 | 0.9 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.7 | 0.0 | 12.1 | 13.2 | 0.0 | 12.5 | 7.9 | 7.2 | 7.2 | 12.0 | 6.5 | 6.5 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 243 | | | 200 | | | 885 | | | 766 | |
| Approach Delay, s/veh | | 13.2 | | | 12.6 | | | 7.2 | | | 7.5 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 24.4 | | 15.0 | | 24.4 | | 15.0 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 8.3 | | 8.0 | | 15.8 | | 5.4 | | | | |
| Green Ext Time (p_c), s | | 5.0 | | 0.9 | | 3.5 | | 1.0 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 8.6 |
| HCM 6th LOS | | A |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 3 | 7 | 7 | 7 | 11 |
| Future Vol, veh/h | 6 | 3 | 7 | 7 | 7 | 11 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 3 | 8 | 8 | 8 | 13 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 10 | 0 | 33 | 9 |
| Stage 1 | - | - | - | - | 9 | - |
| Stage 2 | - | - | - | - | 24 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1610 | - | 980 | 1073 |
| Stage 1 | - | - | - | - | 1014 | - |
| Stage 2 | - | - | - | - | 999 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1610 | - | 975 | 1073 |
| Mov Cap-2 Maneuver | - | - | - | - | 975 | - |
| Stage 1 | - | - | - | - | 1009 | - |
| Stage 2 | - | - | - | - | 999 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.6 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1033 | - | - | 1610 | - |
| HCM Lane V/C Ratio | 0.02 | - | - | 0.005 | - |
| HCM Control Delay (s) | 8.6 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 19 | 109 | 37 | 2 | 101 | 3 | 42 | 10 | 3 | 1 | 3 | 13 |
| Future Vol, veh/h | 19 | 109 | 37 | 2 | 101 | 3 | 42 | 10 | 3 | 1 | 3 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 22 | 127 | 43 | 2 | 117 | 3 | 49 | 12 | 3 | 1 | 3 | 15 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 121 | 0 | 0 | 173 | 0 | 0 | 328 | 321 | 152 | 324 | 341 | 120 |
| Stage 1 | - | - | - | - | - | - | 196 | 196 | - | 124 | 124 | - |
| Stage 2 | - | - | - | - | - | - | 132 | 125 | - | 200 | 217 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1467 | - | - | 1404 | - | - | 625 | 596 | 894 | 629 | 581 | 931 |
| Stage 1 | - | - | - | - | - | - | 806 | 739 | - | 880 | 793 | - |
| Stage 2 | - | - | - | - | - | - | 871 | 792 | - | 802 | 723 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1466 | - | - | 1400 | - | - | 601 | 582 | 891 | 608 | 568 | 930 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 601 | 582 | - | 608 | 568 | - |
| Stage 1 | - | - | - | - | - | - | 790 | 724 | - | 864 | 791 | - |
| Stage 2 | - | - | - | - | - | - | 851 | 790 | - | 773 | 709 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.9 | 0.1 | 11.6 | 9.5 |
| HCM LOS | | | B | A |

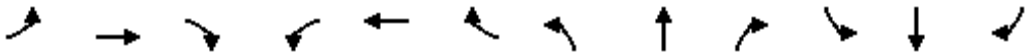
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 608 | 1466 | - | - | 1400 | - | - | 813 |
| HCM Lane V/C Ratio | 0.105 | 0.015 | - | - | 0.002 | - | - | 0.024 |
| HCM Control Delay (s) | 11.6 | 7.5 | 0 | - | 7.6 | 0 | - | 9.5 |
| HCM Lane LOS | B | A | A | - | A | A | - | A |
| HCM 95th %tile Q(veh) | 0.4 | 0 | - | - | 0 | - | - | 0.1 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 94 | 1319 | 18 | 15 | 838 | 13 | 9 | 75 | 11 |
| Future Volume (vph) | 94 | 1319 | 18 | 15 | 838 | 13 | 9 | 75 | 11 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 58.9 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 94 | 1319 | 18 | 15 | 838 | 38 | 13 | 9 | 18 | 75 | 11 | 106 |
| Future Volume (veh/h) | 94 | 1319 | 18 | 15 | 838 | 38 | 13 | 9 | 18 | 75 | 11 | 106 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.99 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 100 | 1403 | 18 | 16 | 891 | 36 | 14 | 10 | 7 | 80 | 12 | 57 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 129 | 1801 | 779 | 35 | 1580 | 64 | 212 | 144 | 78 | 430 | 62 | 294 |
| Arrive On Green | 0.07 | 0.51 | 0.51 | 0.02 | 0.45 | 0.45 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3479 | 141 | 561 | 653 | 354 | 1376 | 281 | 1334 |
| Grp Volume(v), veh/h | 100 | 1403 | 18 | 16 | 455 | 472 | 31 | 0 | 0 | 80 | 0 | 69 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1843 | 1567 | 0 | 0 | 1376 | 0 | 1615 |
| Q Serve(g_s), s | 3.3 | 19.1 | 0.3 | 0.5 | 11.1 | 11.1 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 2.1 |
| Cycle Q Clear(g_c), s | 3.3 | 19.1 | 0.3 | 0.5 | 11.1 | 11.1 | 0.8 | 0.0 | 0.0 | 2.6 | 0.0 | 2.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.08 | 0.45 | | 0.23 | 1.00 | | 0.83 |
| Lane Grp Cap(c), veh/h | 129 | 1801 | 779 | 35 | 807 | 837 | 434 | 0 | 0 | 430 | 0 | 356 |
| V/C Ratio(X) | 0.78 | 0.78 | 0.02 | 0.46 | 0.56 | 0.56 | 0.07 | 0.00 | 0.00 | 0.19 | 0.00 | 0.19 |
| Avail Cap(c_a), veh/h | 252 | 2277 | 985 | 150 | 1037 | 1075 | 918 | 0 | 0 | 869 | 0 | 872 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.0 | 11.9 | 7.3 | 28.8 | 11.9 | 11.9 | 18.3 | 0.0 | 0.0 | 19.0 | 0.0 | 18.8 |
| Incr Delay (d2), s/veh | 3.8 | 1.4 | 0.0 | 3.5 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 5.6 | 0.1 | 0.2 | 3.5 | 3.6 | 0.3 | 0.0 | 0.0 | 0.9 | 0.0 | 0.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 30.8 | 13.3 | 7.3 | 32.2 | 12.5 | 12.5 | 18.3 | 0.0 | 0.0 | 19.0 | 0.0 | 18.9 |
| LnGrp LOS | C | B | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1521 | | | 943 | | | 31 | | | 149 | |
| Approach Delay, s/veh | | 14.4 | | | 12.8 | | | 18.3 | | | 19.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.8 | 35.9 | | 17.7 | 8.9 | 32.7 | | 17.7 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 21.1 | | 4.6 | 5.3 | 13.1 | | 2.8 | | | | |
| Green Ext Time (p_c), s | 0.0 | 9.0 | | 0.4 | 0.0 | 5.5 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.1 | |
| HCM 6th LOS | | B | |

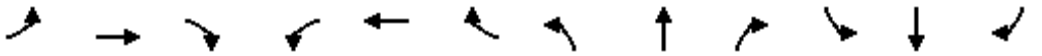
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 1116 | 211 | 96 | 708 | 184 | 156 | 210 | 149 | 134 | 21 |
| Future Volume (vph) | 24 | 1116 | 211 | 96 | 708 | 184 | 156 | 210 | 149 | 134 | 21 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 73.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 1116 | 211 | 96 | 708 | 87 | 184 | 156 | 210 | 149 | 134 | 21 |
| Future Volume (veh/h) | 24 | 1116 | 211 | 96 | 708 | 87 | 184 | 156 | 210 | 149 | 134 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 26 | 1187 | 183 | 102 | 753 | 73 | 196 | 166 | 149 | 159 | 143 | 9 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 50 | 1529 | 671 | 131 | 1552 | 150 | 410 | 529 | 449 | 328 | 1006 | 436 |
| Arrive On Green | 0.03 | 0.43 | 0.43 | 0.07 | 0.48 | 0.48 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3265 | 316 | 1220 | 1870 | 1585 | 1065 | 3554 | 1540 |
| Grp Volume(v), veh/h | 26 | 1187 | 183 | 102 | 410 | 416 | 196 | 166 | 149 | 159 | 143 | 9 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1805 | 1220 | 1870 | 1585 | 1065 | 1777 | 1540 |
| Q Serve(g_s), s | 1.0 | 20.4 | 5.4 | 4.0 | 11.2 | 11.2 | 10.2 | 5.0 | 5.3 | 9.8 | 2.1 | 0.3 |
| Cycle Q Clear(g_c), s | 1.0 | 20.4 | 5.4 | 4.0 | 11.2 | 11.2 | 12.3 | 5.0 | 5.3 | 14.8 | 2.1 | 0.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.18 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 50 | 1529 | 671 | 131 | 845 | 858 | 410 | 529 | 449 | 328 | 1006 | 436 |
| V/C Ratio(X) | 0.52 | 0.78 | 0.27 | 0.78 | 0.48 | 0.49 | 0.48 | 0.31 | 0.33 | 0.48 | 0.14 | 0.02 |
| Avail Cap(c_a), veh/h | 142 | 2019 | 887 | 235 | 1102 | 1119 | 662 | 916 | 776 | 549 | 1745 | 756 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.2 | 17.4 | 13.1 | 32.4 | 12.7 | 12.7 | 23.7 | 20.1 | 20.2 | 25.9 | 19.1 | 18.4 |
| Incr Delay (d2), s/veh | 3.0 | 1.4 | 0.2 | 3.7 | 0.4 | 0.4 | 0.3 | 0.1 | 0.2 | 0.4 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 7.2 | 1.6 | 1.7 | 3.7 | 3.8 | 2.7 | 2.0 | 1.8 | 2.4 | 0.8 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 37.2 | 18.8 | 13.3 | 36.2 | 13.2 | 13.2 | 24.0 | 20.2 | 20.4 | 26.3 | 19.1 | 18.4 |
| LnGrp LOS | D | B | B | D | B | B | C | C | C | C | B | B |
| Approach Vol, veh/h | | 1396 | | | 928 | | | 511 | | | 311 | |
| Approach Delay, s/veh | | 18.4 | | | 15.7 | | | 21.7 | | | 22.8 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.8 | 36.5 | | 25.0 | 6.6 | 39.7 | | 25.0 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.0 | 22.4 | | 16.8 | 3.0 | 13.2 | | 14.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 8.3 | | 0.9 | 0.0 | 5.2 | | 1.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 18.6 | |
| HCM 6th LOS | | B | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 3.4:

# EXISTING (2018) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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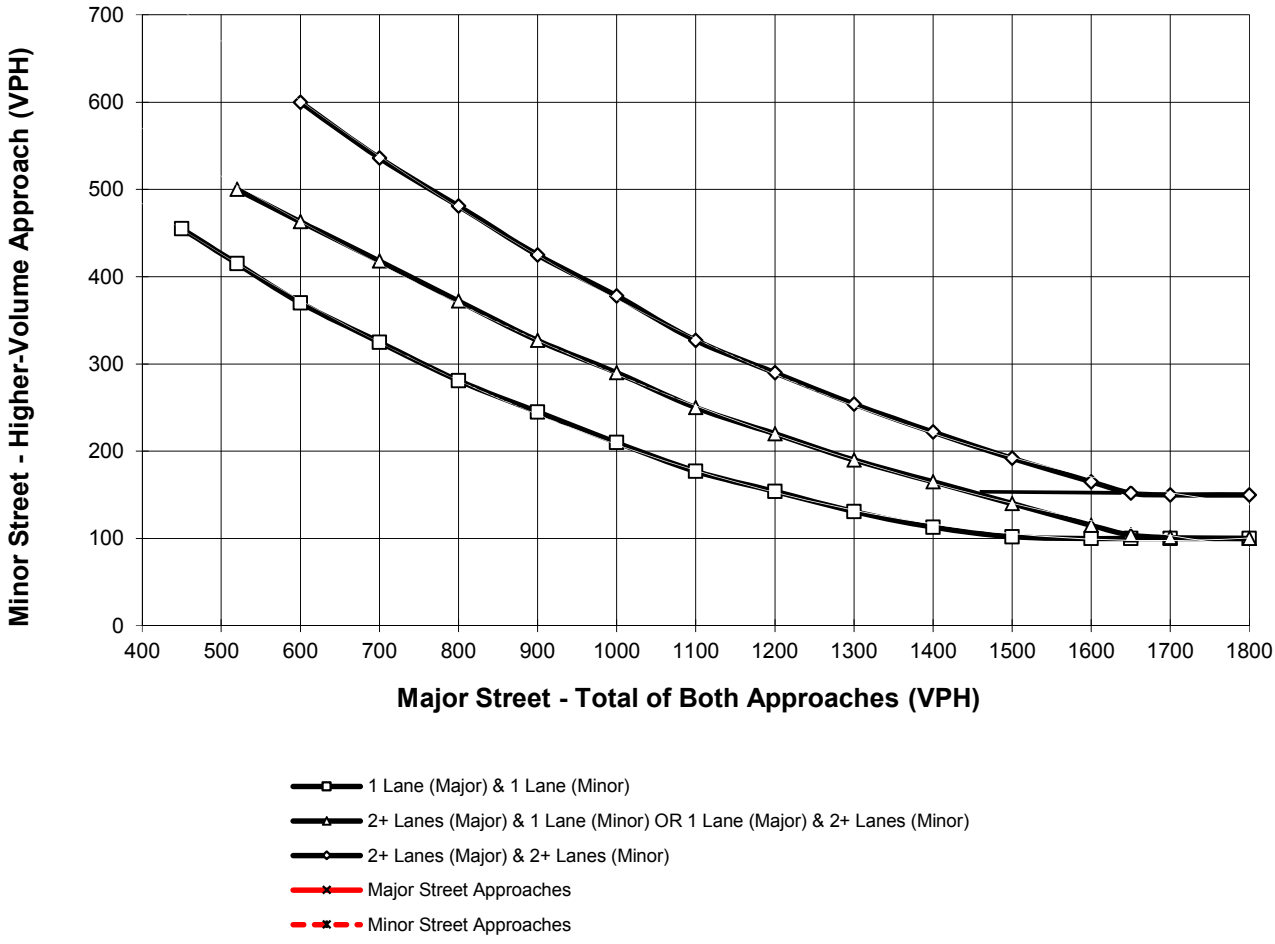
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Existing (2018) Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **39**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **22**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

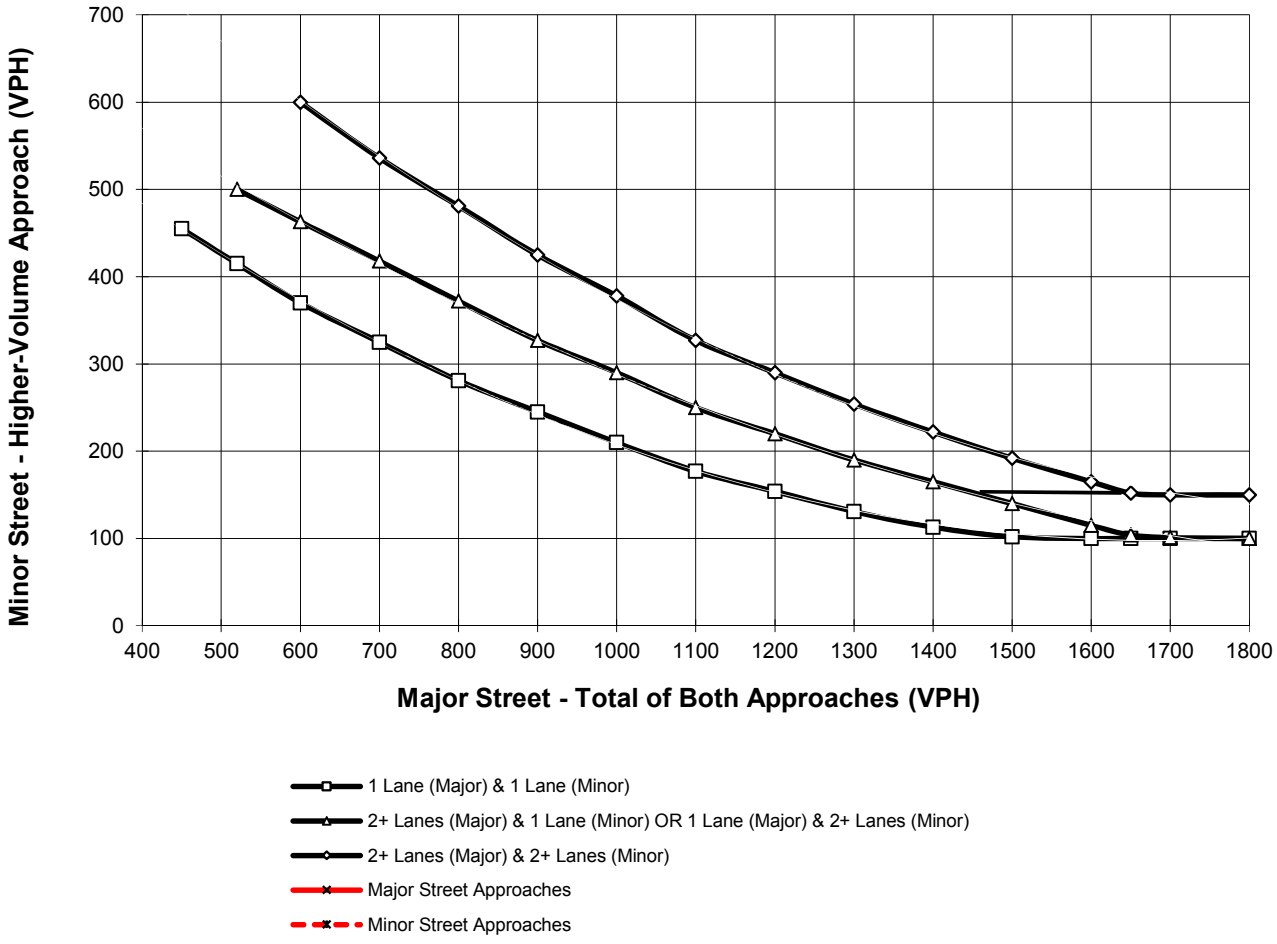
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Existing (2018) Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **238**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **73**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 4.1:

# POST PROCESS WORKSHEETS

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Project: Upland Colonies
Scenario: Horizon Year (2040)

Job #: 11822
Analyst: CHS
Date: 8/17/18

LOCATION: Campus Avenue & 14th Street
FORECAST YEAR: 2040

**INDIVIDUAL TURN VOLUME GROWTH REVIEW**

| | | AM PEAK HOUR INPUT DATA | | | | PM PEAK HOUR INPUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|
| APPROACH | TURNING MOVEMENT | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE |
| NORTH BOUND | Left | 32 | 69 | 37 | 116% | 25 | 62 | 37 | 148% |
| | Through | 413 | 481 | 68 | 16% | 764 | 893 | 129 | 17% |
| | Right | 25 | 29 | 4 | 16% | 51 | 49 | -2 | -4% |
| | NB Total | 470 | 579 | 109 | 23% | 840 | 1,004 | 164 | 20% |
| SOUTH BOUND | Left | 111 | 105 | -6 | -5% | 133 | 130 | -3 | -2% |
| | Through | 588 | 718 | 130 | 22% | 535 | 600 | 65 | 12% |
| | Right | 98 | 170 | 72 | 73% | 56 | 143 | 87 | 155% |
| | SB Total | 797 | 993 | 196 | 25% | 724 | 873 | 149 | 21% |
| EAST BOUND | Left | 73 | 119 | 46 | 63% | 93 | 208 | 115 | 124% |
| | Through | 65 | 106 | 41 | 63% | 121 | 221 | 100 | 83% |
| | Right | 40 | 85 | 45 | 113% | 20 | 42 | 22 | 110% |
| | EB Total | 178 | 310 | 132 | 74% | 234 | 471 | 237 | 101% |
| WEST BOUND | Left | 38 | 38 | 0 | 0% | 34 | 38 | 4 | 12% |
| | Through | 129 | 182 | 53 | 41% | 73 | 185 | 112 | 153% |
| | Right | 132 | 101 | -31 | -23% | 109 | 129 | 20 | 18% |
| | WB Total | 299 | 321 | 22 | 7% | 216 | 352 | 136 | 63% |
| TOTAL ENTERING VOLUME | | 1,744 | 2,203 | 459 | 26% | 2,014 | 2,700 | 686 | 34% |

**FORECAST PEAK HOUR TO ADT COMPARISON**

| | | VOLUMES | | PERCENT OF ADT | | |
|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | ADT |
| North Leg | Inbound | 993 | 873 | | | |
| North Leg | Outbound | 701 | 1,230 | | | |
| **North Leg** | **TOTAL** | **1,694** | **2,103** | **14%** | **17%** | **12,260** |
| | | | | | | |
| South Leg | Inbound | 579 | 1,004 | | | |
| South Leg | Outbound | 841 | 680 | | | |
| **South Leg** | **TOTAL** | **1,420** | **1,684** | **11%** | **13%** | **12,607** |
| | | | | | | |
| East Leg | Inbound | 321 | 352 | | | |
| East Leg | Outbound | 240 | 400 | | | |
| **East Leg** | **TOTAL** | **561** | **752** | **20%** | **27%** | **2,805** |
| | | | | | | |
| West Leg | Inbound | 310 | 471 | | | |
| West Leg | Outbound | 421 | 390 | | | |
| **West Leg** | **TOTAL** | **731** | **861** | **10%** | **12%** | **7,046** |
| | | | | | | |
| ***OVERALL TOTAL*** | | ***4,406*** | ***5,400*** | **13%** | ***16%*** | ***34,718*** |

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Project: Upland Colonies
Scenario: Horizon Year (2040)

Job #: 11822
Analyst: CHS
Date: 8/17/18

LOCATION: Alta Avenue & 14th Street
FORECAST YEAR: 2040

**INDIVIDUAL TURN VOLUME GROWTH REVIEW**

| | | AM PEAK HOUR INPUT DATA | | | | PM PEAK HOUR INPUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|
| APPROACH | TURNING MOVEMENT | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE |
| NORTH BOUND | Left | 57 | 55 | -2 | -4% | 42 | 50 | 8 | 19% |
| | Through | 12 | 11 | -1 | -8% | 10 | 7 | -3 | -30% |
| | Right | 4 | 4 | 0 | 0% | 3 | 4 | 1 | 33% |
| | NB Total | 73 | 70 | -3 | -4% | 55 | 61 | 6 | 11% |
| SOUTH BOUND | Left | 3 | 4 | 1 | 33% | 1 | 1 | 0 | 0% |
| | Through | 11 | 6 | -5 | -45% | 3 | 2 | -1 | -33% |
| | Right | 28 | 31 | 3 | 11% | 13 | 17 | 4 | 31% |
| | SB Total | 42 | 41 | -1 | -2% | 17 | 20 | 3 | 18% |
| EAST BOUND | Left | 11 | 17 | 6 | 55% | 19 | 20 | 1 | 5% |
| | Through | 63 | 122 | 59 | 94% | 109 | 202 | 93 | 85% |
| | Right | 65 | 50 | -15 | -23% | 37 | 37 | 0 | 0% |
| | EB Total | 139 | 189 | 50 | 36% | 165 | 259 | 94 | 57% |
| WEST BOUND | Left | 7 | 4 | -3 | -43% | 2 | 3 | 1 | 50% |
| | Through | 90 | 114 | 24 | 27% | 101 | 244 | 143 | 142% |
| | Right | 2 | 2 | 0 | 0% | 3 | 4 | 1 | 33% |
| | WB Total | 99 | 120 | 21 | 21% | 106 | 251 | 145 | 137% |
| TOTAL ENTERING VOLUME | | 353 | 420 | 67 | 19% | 343 | 591 | 248 | 72% |

**FORECAST PEAK HOUR TO ADT COMPARISON**

| | | VOLUMES | | PERCENT OF ADT | | |
|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | ADT |
| North Leg | Inbound | 41 | 20 | | | |
| North Leg | Outbound | 30 | 31 | | | |
| **North Leg** | **TOTAL** | **71** | **51** | **#DIV/0!** | **#DIV/0!** | **-** |
| | | | | | | |
| South Leg | Inbound | 70 | 61 | | | |
| South Leg | Outbound | 60 | 42 | | | |
| **South Leg** | **TOTAL** | **130** | **103** | **224%** | **178%** | **58** |
| | | | | | | |
| East Leg | Inbound | 120 | 251 | | | |
| East Leg | Outbound | 130 | 207 | | | |
| **East Leg** | **TOTAL** | **250** | **458** | **10%** | **18%** | **2,539** |
| | | | | | | |
| West Leg | Inbound | 189 | 259 | | | |
| West Leg | Outbound | 200 | 311 | | | |
| **West Leg** | **TOTAL** | **389** | **570** | **15%** | **22%** | **2,598** |
| | | | | | | |
| ***OVERALL TOTAL*** | | ***840*** | ***1,182*** | **16%** | ***23%*** | ***5,195*** |

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| | | | |
|---|---|---|---|
| Project: | Upland Colonies | Job #: | 11822 |
| Scenario: | Horizon Year (2040) | Analyst: | CHS |
| | | Date: | 8/17/18 |

LOCATION: Alta Avenue & Foothill Boulevard (SR-66)
FORECAST YEAR: 2040

**INDIVIDUAL TURN VOLUME GROWTH REVIEW**

| | | AM PEAK HOUR INPUT DATA | | | | PM PEAK HOUR INPUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|
| APPROACH | TURNING MOVEMENT | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE |
| NORTH BOUND | Left | 11 | 7 | -4 | -36% | 13 | 7 | -6 | -46% |
| | Through | 6 | 8 | 2 | 33% | 9 | 19 | 10 | 111% |
| | Right | 5 | 4 | -1 | -20% | 18 | 14 | -4 | -22% |
| | NB Total | 22 | 19 | -3 | -14% | 40 | 40 | 0 | 0% |
| SOUTH BOUND | Left | 67 | 166 | 99 | 148% | 75 | 189 | 114 | 152% |
| | Through | 8 | 14 | 6 | 75% | 11 | 17 | 6 | 55% |
| | Right | 100 | 190 | 90 | 90% | 106 | 195 | 89 | 84% |
| | SB Total | 175 | 370 | 195 | 111% | 192 | 401 | 209 | 109% |
| EAST BOUND | Left | 125 | 225 | 100 | 80% | 94 | 226 | 132 | 140% |
| | Through | 524 | 621 | 97 | 19% | 1,319 | 1,207 | -112 | -8% |
| | Right | 20 | 16 | -4 | -20% | 18 | 10 | -8 | -44% |
| | EB Total | 669 | 862 | 193 | 29% | 1,431 | 1,443 | 12 | 1% |
| WEST BOUND | Left | 13 | 11 | -2 | -15% | 15 | 13 | -2 | -13% |
| | Through | 731 | 655 | -76 | -10% | 838 | 828 | -10 | -1% |
| | Right | 97 | 173 | 76 | 78% | 38 | 135 | 97 | 255% |
| | WB Total | 841 | 839 | -2 | 0% | 891 | 976 | 85 | 10% |
| TOTAL ENTERING VOLUME | | 1,707 | 2,090 | 383 | 22% | 2,554 | 2,860 | 306 | 12% |

**FORECAST PEAK HOUR TO ADT COMPARISON**

| | | VOLUMES | | PERCENT OF ADT | | |
|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | ADT |
| North Leg | Inbound | 370 | 401 | | | |
| North Leg | Outbound | 406 | 380 | | | |
| **North Leg** | **TOTAL** | **776** | **781** | **10%** | **10%** | **7,750** |
| | | | | | | |
| South Leg | Inbound | 19 | 40 | | | |
| South Leg | Outbound | 41 | 40 | | | |
| **South Leg** | **TOTAL** | **60** | **80** | **#DIV/0!** | **#DIV/0!** | **-** |
| | | | | | | |
| East Leg | Inbound | 839 | 976 | | | |
| East Leg | Outbound | 791 | 1,410 | | | |
| **East Leg** | **TOTAL** | **1,630** | **2,386** | **5%** | **7%** | **35,913** |
| | | | | | | |
| West Leg | Inbound | 862 | 1,443 | | | |
| West Leg | Outbound | 852 | 1,030 | | | |
| **West Leg** | **TOTAL** | **1,714** | **2,473** | **5%** | **7%** | **35,154** |
| | | | | | | |
| ***OVERALL TOTAL*** | | ***4,180*** | ***5,720*** | **5%** | ***7%*** | ***78,817*** |

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| | | | |
|---|---|---|---|
| Project: | Upland Colonies | Job #: | 11822 |
| Scenario: | Horizon Year (2040) | Analyst: | CHS |
| | | Date: | 8/17/18 |

LOCATION: Grove Avenue & Foothill Boulevard (SR-66)
FORECAST YEAR: 2040

**INDIVIDUAL TURN VOLUME GROWTH REVIEW**

| | | AM PEAK HOUR INPUT DATA | | | | PM PEAK HOUR INPUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|
| APPROACH | TURNING MOVEMENT | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE | EXISTING COUNT | FUTURE VOLUME | DIFF-ERENCE | % CHANGE |
| NORTH BOUND | Left | 165 | 141 | -24 | -15% | 184 | 153 | -31 | -17% |
| | Through | 69 | 71 | 2 | 3% | 156 | 208 | 52 | 33% |
| | Right | 150 | 138 | -12 | -8% | 210 | 136 | -74 | -35% |
| | NB Total | 384 | 350 | -34 | -9% | 550 | 497 | -53 | -10% |
| SOUTH BOUND | Left | 67 | 116 | 49 | 73% | 149 | 207 | 58 | 39% |
| | Through | 80 | 84 | 4 | 5% | 134 | 149 | 15 | 11% |
| | Right | 13 | 21 | 8 | 62% | 21 | 37 | 16 | 76% |
| | SB Total | 160 | 221 | 61 | 38% | 304 | 393 | 89 | 29% |
| EAST BOUND | Left | 12 | 20 | 8 | 67% | 24 | 50 | 26 | 108% |
| | Through | 398 | 578 | 180 | 45% | 1,116 | 1,137 | 21 | 2% |
| | Right | 139 | 122 | -17 | -12% | 211 | 172 | -39 | -18% |
| | EB Total | 549 | 720 | 171 | 31% | 1,351 | 1,359 | 8 | 1% |
| WEST BOUND | Left | 130 | 88 | -42 | -32% | 96 | 69 | -27 | -28% |
| | Through | 696 | 721 | 25 | 4% | 708 | 820 | 112 | 16% |
| | Right | 57 | 71 | 14 | 25% | 87 | 162 | 75 | 86% |
| | WB Total | 883 | 880 | -3 | 0% | 891 | 1,051 | 160 | 18% |
| TOTAL ENTERING VOLUME | | 1,976 | 2,171 | 195 | 10% | 3,096 | 3,300 | 204 | 7% |

**FORECAST PEAK HOUR TO ADT COMPARISON**

| | | VOLUMES | | PERCENT OF ADT | | |
|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | ADT |
| North Leg | Inbound | 221 | 393 | | | |
| North Leg | Outbound | 162 | 420 | | | |
| **North Leg** | **TOTAL** | **383** | **813** | **15%** | **32%** | **2,570** |
| | | | | | | |
| South Leg | Inbound | 350 | 497 | | | |
| South Leg | Outbound | 294 | 390 | | | |
| **South Leg** | **TOTAL** | **644** | **887** | **7%** | **10%** | **9,157** |
| | | | | | | |
| East Leg | Inbound | 880 | 1,051 | | | |
| East Leg | Outbound | 832 | 1,480 | | | |
| **East Leg** | **TOTAL** | **1,712** | **2,531** | **5%** | **8%** | **33,032** |
| | | | | | | |
| West Leg | Inbound | 720 | 1,359 | | | |
| West Leg | Outbound | 883 | 1,010 | | | |
| **West Leg** | **TOTAL** | **1,603** | **2,369** | **4%** | **7%** | **35,914** |
| | | | | | | |
| ***OVERALL TOTAL*** | | ***4,342*** | ***6,600*** | **5%** | ***8%*** | ***80,673*** |

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# APPENDIX 5.1:

## E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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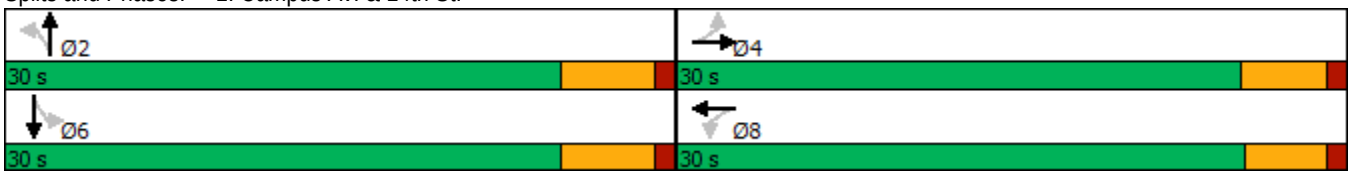
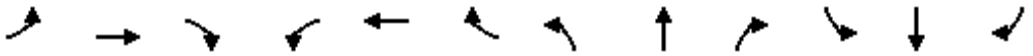
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 73 | 67 | 45 | 135 | 32 | 413 | 116 | 588 |
| Future Volume (vph) | 73 | 67 | 45 | 135 | 32 | 413 | 116 | 588 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 39.7 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 73 | 67 | 40 | 45 | 135 | 147 | 32 | 413 | 28 | 116 | 588 | 98 |
| Future Volume (veh/h) | 73 | 67 | 40 | 45 | 135 | 147 | 32 | 413 | 28 | 116 | 588 | 98 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.98 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 84 | 77 | 40 | 52 | 155 | 135 | 37 | 475 | 27 | 133 | 676 | 111 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 399 | 370 | 192 | 540 | 297 | 258 | 359 | 1381 | 78 | 473 | 1234 | 202 |
| Arrive On Green | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Sat Flow, veh/h | 1089 | 1150 | 597 | 1254 | 922 | 803 | 688 | 3418 | 194 | 896 | 3055 | 501 |
| Grp Volume(v), veh/h | 84 | 0 | 117 | 52 | 0 | 290 | 37 | 246 | 256 | 133 | 393 | 394 |
| Grp Sat Flow(s),veh/h/ln | 1089 | 0 | 1747 | 1254 | 0 | 1725 | 688 | 1777 | 1835 | 896 | 1777 | 1779 |
| Q Serve(g_s), s | 2.5 | 0.0 | 1.8 | 1.1 | 0.0 | 5.0 | 1.6 | 3.5 | 3.5 | 4.4 | 6.2 | 6.2 |
| Cycle Q Clear(g_c), s | 7.5 | 0.0 | 1.8 | 2.9 | 0.0 | 5.0 | 7.8 | 3.5 | 3.5 | 7.9 | 6.2 | 6.2 |
| Prop In Lane | 1.00 | | 0.34 | 1.00 | | 0.47 | 1.00 | | 0.11 | 1.00 | | 0.28 |
| Lane Grp Cap(c), veh/h | 399 | 0 | 562 | 540 | 0 | 555 | 359 | 718 | 741 | 473 | 718 | 719 |
| V/C Ratio(X) | 0.21 | 0.00 | 0.21 | 0.10 | 0.00 | 0.52 | 0.10 | 0.34 | 0.34 | 0.28 | 0.55 | 0.55 |
| Avail Cap(c_a), veh/h | 801 | 0 | 1208 | 1010 | 0 | 1202 | 549 | 1209 | 1249 | 721 | 1209 | 1211 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.1 | 0.0 | 9.0 | 10.0 | 0.0 | 10.1 | 11.3 | 7.5 | 7.5 | 10.3 | 8.3 | 8.3 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 0.8 | 0.1 | 0.3 | 0.3 | 0.3 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 0.5 | 0.3 | 0.0 | 1.6 | 0.2 | 0.8 | 0.9 | 0.6 | 1.5 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.4 | 0.0 | 9.2 | 10.1 | 0.0 | 10.8 | 11.4 | 7.8 | 7.8 | 10.6 | 9.0 | 9.0 |
| LnGrp LOS | B | A | A | B | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 201 | | | 342 | | | 539 | | | 920 | |
| Approach Delay, s/veh | | 10.9 | | | 10.7 | | | 8.0 | | | 9.2 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 19.9 | | 16.5 | | 19.9 | | 16.5 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 9.8 | | 9.5 | | 9.9 | | 7.0 | | | | |
| Green Ext Time (p_c), s | | 2.7 | | 0.8 | | 4.8 | | 1.9 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 9.3 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Future Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 3 | 4 | 12 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 7 | 0 | - | 0 | 8 | 5 |
| Stage 1 | - | - | - | - | 5 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Mov Cap-2 Maneuver | - | - | - | - | 1013 | - |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1614 | - | - | - | 1013 |
| HCM Lane V/C Ratio | - | - | - | - | 0.012 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 28 | 17 | 9 | 26 | 0 |
| Future Vol, veh/h | 0 | 28 | 17 | 9 | 26 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 30 | 18 | 10 | 28 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 28 | 0 | - | 0 | 53 | 23 |
| Stage 1 | - | - | - | - | 23 | - |
| Stage 2 | - | - | - | - | 30 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1585 | - | - | - | 955 | 1054 |
| Stage 1 | - | - | - | - | 1000 | - |
| Stage 2 | - | - | - | - | 993 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1585 | - | - | - | 955 | 1054 |
| Mov Cap-2 Maneuver | - | - | - | - | 955 | - |
| Stage 1 | - | - | - | - | 1000 | - |
| Stage 2 | - | - | - | - | 993 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1585 | - | - | - | 955 |
| HCM Lane V/C Ratio | - | - | - | - | 0.03 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 51 | 18 | 4 | 22 | 13 |
| Future Vol, veh/h | 3 | 51 | 18 | 4 | 22 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 74 | 26 | 6 | 32 | 19 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 78 | 0 | 99 | 42 |
| Stage 1 | - | - | - | - | 41 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1520 | - | 900 | 1029 |
| Stage 1 | - | - | - | - | 981 | - |
| Stage 2 | - | - | - | - | 965 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1520 | - | 885 | 1028 |
| Mov Cap-2 Maneuver | - | - | - | - | 885 | - |
| Stage 1 | - | - | - | - | 964 | - |
| Stage 2 | - | - | - | - | 965 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 6.1 | 9.1 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 933 | - | - | 1520 | - |
| HCM Lane V/C Ratio | 0.054 | - | - | 0.017 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 21 | 63 | 65 | 7 | 90 | 2 | 57 | 15 | 4 | 3 | 20 | 56 |
| Future Vol, veh/h | 21 | 63 | 65 | 7 | 90 | 2 | 57 | 15 | 4 | 3 | 20 | 56 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 27 | 81 | 83 | 9 | 115 | 3 | 73 | 19 | 5 | 4 | 26 | 72 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 120 | 0 | 0 | 185 | 0 | 0 | 383 | 336 | 148 | 330 | 376 | 120 |
| Stage 1 | - | - | - | - | - | - | 198 | 198 | - | 137 | 137 | - |
| Stage 2 | - | - | - | - | - | - | 185 | 138 | - | 193 | 239 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1468 | - | - | 1390 | - | - | 575 | 585 | 899 | 623 | 555 | 931 |
| Stage 1 | - | - | - | - | - | - | 804 | 737 | - | 866 | 783 | - |
| Stage 2 | - | - | - | - | - | - | 817 | 782 | - | 809 | 708 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1465 | - | - | 1362 | - | - | 490 | 557 | 878 | 587 | 528 | 928 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 490 | 557 | - | 587 | 528 | - |
| Stage 1 | - | - | - | - | - | - | 772 | 708 | - | 847 | 776 | - |
| Stage 2 | - | - | - | - | - | - | 723 | 775 | - | 764 | 680 | - |

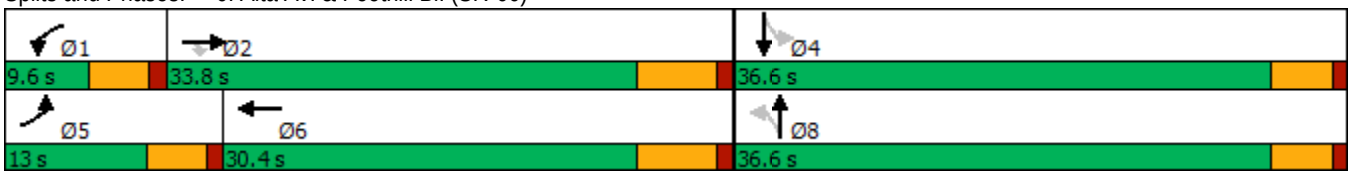
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.1 | 0.5 | 13.6 | 10.4 |
| HCM LOS | | | B | B |

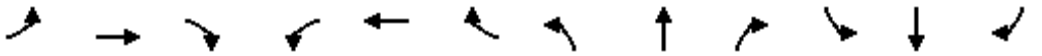
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 514 | 1465 | - | - | 1362 | - | - | 765 |
| HCM Lane V/C Ratio | 0.19 | 0.018 | - | - | 0.007 | - | - | 0.132 |
| HCM Control Delay (s) | 13.6 | 7.5 | 0 | - | 7.7 | 0 | - | 10.4 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.7 | 0.1 | - | - | 0 | - | - | 0.5 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 125 | 524 | 20 | 13 | 731 | 11 | 6 | 76 | 8 |
| Future Volume (vph) | 125 | 524 | 20 | 13 | 731 | 11 | 6 | 76 | 8 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 58.6 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 125 | 524 | 20 | 13 | 731 | 100 | 11 | 6 | 5 | 76 | 8 | 100 |
| Future Volume (veh/h) | 125 | 524 | 20 | 13 | 731 | 100 | 11 | 6 | 5 | 76 | 8 | 100 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 140 | 589 | 19 | 15 | 821 | 103 | 12 | 7 | 4 | 85 | 9 | 91 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 180 | 1570 | 679 | 34 | 1142 | 143 | 250 | 135 | 57 | 488 | 33 | 329 |
| Arrive On Green | 0.10 | 0.44 | 0.44 | 0.02 | 0.36 | 0.36 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3173 | 398 | 595 | 592 | 250 | 1397 | 142 | 1440 |
| Grp Volume(v), veh/h | 140 | 589 | 19 | 15 | 460 | 464 | 23 | 0 | 0 | 85 | 0 | 100 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1795 | 1436 | 0 | 0 | 1397 | 0 | 1582 |
| Q Serve(g_s), s | 3.7 | 5.4 | 0.3 | 0.4 | 10.8 | 10.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 |
| Cycle Q Clear(g_c), s | 3.7 | 5.4 | 0.3 | 0.4 | 10.8 | 10.8 | 2.5 | 0.0 | 0.0 | 1.9 | 0.0 | 2.5 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.22 | 0.52 | | 0.17 | 1.00 | | 0.91 |
| Lane Grp Cap(c), veh/h | 180 | 1570 | 679 | 34 | 639 | 646 | 442 | 0 | 0 | 488 | 0 | 362 |
| V/C Ratio(X) | 0.78 | 0.38 | 0.03 | 0.45 | 0.72 | 0.72 | 0.05 | 0.00 | 0.00 | 0.17 | 0.00 | 0.28 |
| Avail Cap(c_a), veh/h | 310 | 2062 | 892 | 185 | 906 | 915 | 1084 | 0 | 0 | 1095 | 0 | 1049 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.2 | 9.0 | 7.6 | 23.4 | 13.3 | 13.3 | 14.5 | 0.0 | 0.0 | 15.1 | 0.0 | 15.3 |
| Incr Delay (d2), s/veh | 2.8 | 0.1 | 0.0 | 3.4 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 1.4 | 0.1 | 0.2 | 3.4 | 3.4 | 0.2 | 0.0 | 0.0 | 0.7 | 0.0 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.9 | 9.2 | 7.6 | 26.8 | 15.0 | 14.9 | 14.6 | 0.0 | 0.0 | 15.1 | 0.0 | 15.5 |
| LnGrp LOS | C | A | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 748 | | | 939 | | | 23 | | | 185 | |
| Approach Delay, s/veh | | 11.9 | | | 15.1 | | | 14.6 | | | 15.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.5 | 27.1 | | 15.6 | 9.5 | 23.2 | | 15.6 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.4 | 7.4 | | 4.5 | 5.7 | 12.8 | | 4.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.6 | | 0.5 | 0.0 | 4.2 | | 0.0 | | | | |

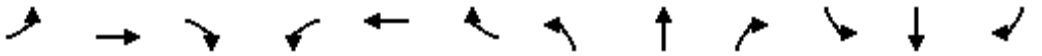
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 13.9 | |
| HCM 6th LOS | | B | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 404 | 143 | 130 | 698 | 166 | 69 | 150 | 67 | 80 | 13 |
| Future Volume (vph) | 12 | 404 | 143 | 130 | 698 | 166 | 69 | 150 | 67 | 80 | 13 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 100 |
| Actuated Cycle Length: 53.9 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 404 | 143 | 130 | 698 | 57 | 166 | 69 | 150 | 67 | 80 | 13 |
| Future Volume (veh/h) | 12 | 404 | 143 | 130 | 698 | 57 | 166 | 69 | 150 | 67 | 80 | 13 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 13 | 444 | 133 | 143 | 767 | 54 | 182 | 76 | 135 | 74 | 88 | 2 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 30 | 946 | 418 | 186 | 1190 | 84 | 527 | 588 | 492 | 483 | 1118 | 483 |
| Arrive On Green | 0.02 | 0.27 | 0.27 | 0.10 | 0.35 | 0.35 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1781 | 3554 | 1573 | 1781 | 3361 | 237 | 1271 | 1870 | 1563 | 1170 | 3554 | 1535 |
| Grp Volume(v), veh/h | 13 | 444 | 133 | 143 | 405 | 416 | 182 | 76 | 135 | 74 | 88 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1573 | 1781 | 1777 | 1821 | 1271 | 1870 | 1563 | 1170 | 1777 | 1535 |
| Q Serve(g_s), s | 0.3 | 5.1 | 3.3 | 3.8 | 9.2 | 9.2 | 5.7 | 1.4 | 3.1 | 2.3 | 0.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.3 | 5.1 | 3.3 | 3.8 | 9.2 | 9.2 | 6.5 | 1.4 | 3.1 | 3.7 | 0.8 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.13 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 30 | 946 | 418 | 186 | 629 | 645 | 527 | 588 | 492 | 483 | 1118 | 483 |
| V/C Ratio(X) | 0.44 | 0.47 | 0.32 | 0.77 | 0.64 | 0.64 | 0.35 | 0.13 | 0.27 | 0.15 | 0.08 | 0.00 |
| Avail Cap(c_a), veh/h | 273 | 2002 | 886 | 753 | 1480 | 1516 | 1107 | 1441 | 1205 | 1019 | 2746 | 1186 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.5 | 14.9 | 14.2 | 21.0 | 13.0 | 13.1 | 13.9 | 11.8 | 12.4 | 13.2 | 11.6 | 11.4 |
| Incr Delay (d2), s/veh | 3.8 | 0.4 | 0.4 | 2.5 | 1.1 | 1.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 1.6 | 1.0 | 1.4 | 2.9 | 2.9 | 1.3 | 0.5 | 0.9 | 0.5 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.3 | 15.2 | 14.6 | 23.6 | 14.2 | 14.1 | 14.1 | 11.9 | 12.5 | 13.2 | 11.6 | 11.4 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 590 | | | 964 | | | 393 | | | 164 | |
| Approach Delay, s/veh | | 15.4 | | | 15.5 | | | 13.1 | | | 12.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 18.6 | | 20.0 | 5.4 | 22.9 | | 20.0 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.8 | 7.1 | | 5.7 | 2.3 | 11.2 | | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.1 | 3.0 | | 0.5 | 0.0 | 5.0 | | 0.7 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.8 | |
| HCM 6th LOS | | B | |

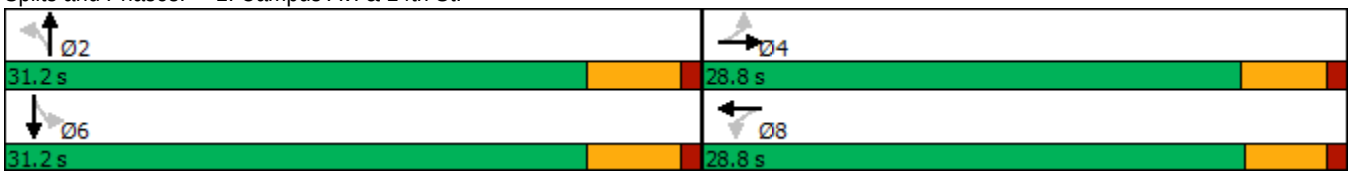
Notes

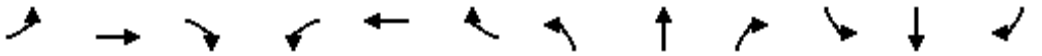
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 93 | 127 | 39 | 77 | 25 | 764 | 149 | 535 |
| Future Volume (vph) | 93 | 127 | 39 | 77 | 25 | 764 | 149 | 535 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 44.4 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 93 | 127 | 20 | 39 | 77 | 119 | 25 | 764 | 59 | 149 | 535 | 56 |
| Future Volume (veh/h) | 93 | 127 | 20 | 39 | 77 | 119 | 25 | 764 | 59 | 149 | 535 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 99 | 135 | 15 | 41 | 82 | 97 | 27 | 813 | 54 | 159 | 569 | 56 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 374 | 415 | 46 | 405 | 197 | 232 | 495 | 1699 | 113 | 397 | 1644 | 161 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1205 | 1650 | 183 | 1233 | 781 | 923 | 800 | 3377 | 224 | 638 | 3268 | 321 |
| Grp Volume(v), veh/h | 99 | 0 | 150 | 41 | 0 | 179 | 27 | 428 | 439 | 159 | 309 | 316 |
| Grp Sat Flow(s),veh/h/ln | 1205 | 0 | 1833 | 1233 | 0 | 1704 | 800 | 1777 | 1824 | 638 | 1777 | 1812 |
| Q Serve(g_s), s | 3.1 | 0.0 | 2.7 | 1.1 | 0.0 | 3.6 | 0.9 | 6.4 | 6.4 | 8.9 | 4.3 | 4.3 |
| Cycle Q Clear(g_c), s | 6.6 | 0.0 | 2.7 | 3.9 | 0.0 | 3.6 | 5.1 | 6.4 | 6.4 | 15.3 | 4.3 | 4.3 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.54 | 1.00 | | 0.12 | 1.00 | | 0.18 |
| Lane Grp Cap(c), veh/h | 374 | 0 | 462 | 405 | 0 | 429 | 495 | 894 | 918 | 397 | 894 | 912 |
| V/C Ratio(X) | 0.26 | 0.00 | 0.33 | 0.10 | 0.00 | 0.42 | 0.05 | 0.48 | 0.48 | 0.40 | 0.35 | 0.35 |
| Avail Cap(c_a), veh/h | 780 | 0 | 1078 | 826 | 0 | 1011 | 602 | 1132 | 1162 | 483 | 1132 | 1155 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.5 | 0.0 | 12.4 | 14.0 | 0.0 | 12.8 | 7.6 | 6.6 | 6.6 | 11.6 | 6.1 | 6.1 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.4 | 0.1 | 0.0 | 0.6 | 0.0 | 0.4 | 0.4 | 0.7 | 0.2 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.9 | 0.3 | 0.0 | 1.2 | 0.1 | 1.4 | 1.4 | 0.9 | 0.9 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.9 | 0.0 | 12.8 | 14.1 | 0.0 | 13.4 | 7.7 | 7.0 | 7.0 | 12.3 | 6.3 | 6.3 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 249 | | | 220 | | | 894 | | | 784 | |
| Approach Delay, s/veh | | 14.1 | | | 13.5 | | | 7.0 | | | 7.5 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 25.7 | | 15.1 | | 25.7 | | 15.1 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 8.4 | | 8.6 | | 17.3 | | 5.9 | | | | |
| Green Ext Time (p_c), s | | 5.1 | | 1.0 | | 3.2 | | 1.1 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 8.7 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 7 | 12 | 7 | 0 |
| Future Vol, veh/h | 0 | 3 | 7 | 12 | 7 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 8 | 13 | 8 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 21 | 0 | - | 0 | 18 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1595 | - | - | - | 1000 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1595 | - | - | - | 1000 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 1000 | - |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1595 | - | - | - | 1000 |
| HCM Lane V/C Ratio | - | - | - | - | 0.008 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 16 | 26 | 29 | 17 | 0 |
| Future Vol, veh/h | 0 | 16 | 26 | 29 | 17 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 17 | 28 | 32 | 18 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 60 | 0 | - | 0 | 61 | 44 |
| Stage 1 | - | - | - | - | 44 | - |
| Stage 2 | - | - | - | - | 17 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1544 | - | - | - | 945 | 1026 |
| Stage 1 | - | - | - | - | 978 | - |
| Stage 2 | - | - | - | - | 1006 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1544 | - | - | - | 945 | 1026 |
| Mov Cap-2 Maneuver | - | - | - | - | 945 | - |
| Stage 1 | - | - | - | - | 978 | - |
| Stage 2 | - | - | - | - | 1006 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1544 | - | - | - | 945 |
| HCM Lane V/C Ratio | - | - | - | - | 0.02 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 27 | 7 | 7 | 48 | 11 |
| Future Vol, veh/h | 6 | 27 | 7 | 7 | 48 | 11 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 31 | 8 | 8 | 56 | 13 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 38 | 0 | 47 | 23 |
| Stage 1 | - | - | - | - | 23 | - |
| Stage 2 | - | - | - | - | 24 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1572 | - | 963 | 1054 |
| Stage 1 | - | - | - | - | 1000 | - |
| Stage 2 | - | - | - | - | 999 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1572 | - | 958 | 1054 |
| Mov Cap-2 Maneuver | - | - | - | - | 958 | - |
| Stage 1 | - | - | - | - | 995 | - |
| Stage 2 | - | - | - | - | 999 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.7 | 9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 975 | - | - | 1572 | - |
| HCM Lane V/C Ratio | 0.07 | - | - | 0.005 | - |
| HCM Control Delay (s) | 9 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 50 | 109 | 37 | 2 | 101 | 3 | 42 | 20 | 3 | 1 | 9 | 31 |
| Future Vol, veh/h | 50 | 109 | 37 | 2 | 101 | 3 | 42 | 20 | 3 | 1 | 9 | 31 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 58 | 127 | 43 | 2 | 117 | 3 | 49 | 23 | 3 | 1 | 10 | 36 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 121 | 0 | 0 | 173 | 0 | 0 | 414 | 393 | 152 | 402 | 413 | 120 |
| Stage 1 | - | - | - | - | - | - | 268 | 268 | - | 124 | 124 | - |
| Stage 2 | - | - | - | - | - | - | 146 | 125 | - | 278 | 289 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1467 | - | - | 1404 | - | - | 549 | 543 | 894 | 559 | 529 | 931 |
| Stage 1 | - | - | - | - | - | - | 738 | 687 | - | 880 | 793 | - |
| Stage 2 | - | - | - | - | - | - | 857 | 792 | - | 728 | 673 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1466 | - | - | 1400 | - | - | 500 | 516 | 891 | 518 | 503 | 930 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 500 | 516 | - | 518 | 503 | - |
| Stage 1 | - | - | - | - | - | - | 703 | 655 | - | 840 | 791 | - |
| Stage 2 | - | - | - | - | - | - | 811 | 790 | - | 669 | 641 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.9 | 0.1 | 13.2 | 10 |
| HCM LOS | | | B | B |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 515 | 1466 | - | - | 1400 | - | - | 771 |
| HCM Lane V/C Ratio | 0.147 | 0.04 | - | - | 0.002 | - | - | 0.062 |
| HCM Control Delay (s) | 13.2 | 7.6 | 0 | - | 7.6 | 0 | - | 10 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.5 | 0.1 | - | - | 0 | - | - | 0.2 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 94 | 1319 | 18 | 15 | 838 | 13 | 9 | 81 | 11 |
| Future Volume (vph) | 94 | 1319 | 18 | 15 | 838 | 13 | 9 | 81 | 11 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 59.1 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 94 | 1319 | 18 | 15 | 838 | 48 | 13 | 9 | 18 | 81 | 11 | 106 |
| Future Volume (veh/h) | 94 | 1319 | 18 | 15 | 838 | 48 | 13 | 9 | 18 | 81 | 11 | 106 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.99 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 100 | 1403 | 18 | 16 | 891 | 47 | 14 | 10 | 7 | 86 | 12 | 57 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 129 | 1801 | 779 | 35 | 1558 | 82 | 212 | 144 | 78 | 430 | 62 | 294 |
| Arrive On Green | 0.07 | 0.51 | 0.51 | 0.02 | 0.45 | 0.45 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3431 | 181 | 561 | 653 | 354 | 1376 | 281 | 1334 |
| Grp Volume(v), veh/h | 100 | 1403 | 18 | 16 | 461 | 477 | 31 | 0 | 0 | 86 | 0 | 69 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1835 | 1567 | 0 | 0 | 1376 | 0 | 1615 |
| Q Serve(g_s), s | 3.3 | 19.1 | 0.3 | 0.5 | 11.4 | 11.4 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.1 |
| Cycle Q Clear(g_c), s | 3.3 | 19.1 | 0.3 | 0.5 | 11.4 | 11.4 | 0.8 | 0.0 | 0.0 | 2.8 | 0.0 | 2.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.10 | 0.45 | | 0.23 | 1.00 | | 0.83 |
| Lane Grp Cap(c), veh/h | 129 | 1801 | 779 | 35 | 807 | 833 | 434 | 0 | 0 | 430 | 0 | 356 |
| V/C Ratio(X) | 0.78 | 0.78 | 0.02 | 0.46 | 0.57 | 0.57 | 0.07 | 0.00 | 0.00 | 0.20 | 0.00 | 0.19 |
| Avail Cap(c_a), veh/h | 252 | 2277 | 985 | 150 | 1037 | 1071 | 918 | 0 | 0 | 869 | 0 | 872 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.0 | 11.9 | 7.3 | 28.8 | 11.9 | 11.9 | 18.3 | 0.0 | 0.0 | 19.1 | 0.0 | 18.8 |
| Incr Delay (d2), s/veh | 3.8 | 1.4 | 0.0 | 3.5 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 5.6 | 0.1 | 0.2 | 3.5 | 3.6 | 0.3 | 0.0 | 0.0 | 0.9 | 0.0 | 0.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 30.8 | 13.3 | 7.3 | 32.2 | 12.6 | 12.6 | 18.3 | 0.0 | 0.0 | 19.1 | 0.0 | 18.9 |
| LnGrp LOS | C | B | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1521 | | | 954 | | | 31 | | | 155 | |
| Approach Delay, s/veh | | 14.4 | | | 12.9 | | | 18.3 | | | 19.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.8 | 35.9 | | 17.7 | 8.9 | 32.7 | | 17.7 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 21.1 | | 4.8 | 5.3 | 13.4 | | 2.8 | | | | |
| Green Ext Time (p_c), s | 0.0 | 9.0 | | 0.4 | 0.0 | 5.5 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.2 | |
| HCM 6th LOS | | B | |

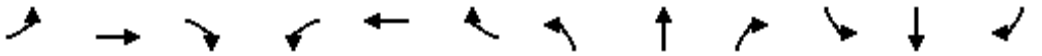
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 1120 | 213 | 96 | 714 | 188 | 156 | 210 | 149 | 134 | 21 |
| Future Volume (vph) | 24 | 1120 | 213 | 96 | 714 | 188 | 156 | 210 | 149 | 134 | 21 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 74.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 1120 | 213 | 96 | 714 | 87 | 188 | 156 | 210 | 149 | 134 | 21 |
| Future Volume (veh/h) | 24 | 1120 | 213 | 96 | 714 | 87 | 188 | 156 | 210 | 149 | 134 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 26 | 1191 | 186 | 102 | 760 | 73 | 200 | 166 | 149 | 159 | 143 | 9 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 50 | 1531 | 673 | 131 | 1556 | 149 | 409 | 529 | 448 | 328 | 1005 | 436 |
| Arrive On Green | 0.03 | 0.43 | 0.43 | 0.07 | 0.48 | 0.48 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3268 | 314 | 1220 | 1870 | 1585 | 1065 | 3554 | 1540 |
| Grp Volume(v), veh/h | 26 | 1191 | 186 | 102 | 413 | 420 | 200 | 166 | 149 | 159 | 143 | 9 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1805 | 1220 | 1870 | 1585 | 1065 | 1777 | 1540 |
| Q Serve(g_s), s | 1.0 | 20.5 | 5.5 | 4.0 | 11.3 | 11.3 | 10.5 | 5.0 | 5.3 | 9.9 | 2.1 | 0.3 |
| Cycle Q Clear(g_c), s | 1.0 | 20.5 | 5.5 | 4.0 | 11.3 | 11.3 | 12.6 | 5.0 | 5.3 | 14.9 | 2.1 | 0.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.17 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 50 | 1531 | 673 | 131 | 846 | 860 | 409 | 529 | 448 | 328 | 1005 | 436 |
| V/C Ratio(X) | 0.52 | 0.78 | 0.28 | 0.78 | 0.49 | 0.49 | 0.49 | 0.31 | 0.33 | 0.49 | 0.14 | 0.02 |
| Avail Cap(c_a), veh/h | 142 | 2014 | 885 | 234 | 1099 | 1116 | 660 | 913 | 774 | 548 | 1740 | 754 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.2 | 17.4 | 13.1 | 32.5 | 12.8 | 12.8 | 23.9 | 20.2 | 20.3 | 26.0 | 19.1 | 18.5 |
| Incr Delay (d2), s/veh | 3.0 | 1.5 | 0.2 | 3.7 | 0.4 | 0.4 | 0.3 | 0.1 | 0.2 | 0.4 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 7.2 | 1.7 | 1.7 | 3.8 | 3.8 | 2.8 | 2.0 | 1.8 | 2.4 | 0.8 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 37.3 | 18.9 | 13.4 | 36.3 | 13.2 | 13.2 | 24.2 | 20.3 | 20.4 | 26.4 | 19.2 | 18.5 |
| LnGrp LOS | D | B | B | D | B | B | C | C | C | C | B | B |
| Approach Vol, veh/h | | 1403 | | | 935 | | | 515 | | | 311 | |
| Approach Delay, s/veh | | 18.5 | | | 15.7 | | | 21.9 | | | 22.9 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.9 | 36.6 | | 25.0 | 6.6 | 39.8 | | 25.0 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.0 | 22.5 | | 16.9 | 3.0 | 13.3 | | 14.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 8.3 | | 0.9 | 0.0 | 5.2 | | 1.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 18.6 | |
| HCM 6th LOS | | B | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 5.2:

# E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday AM Peak Hour**

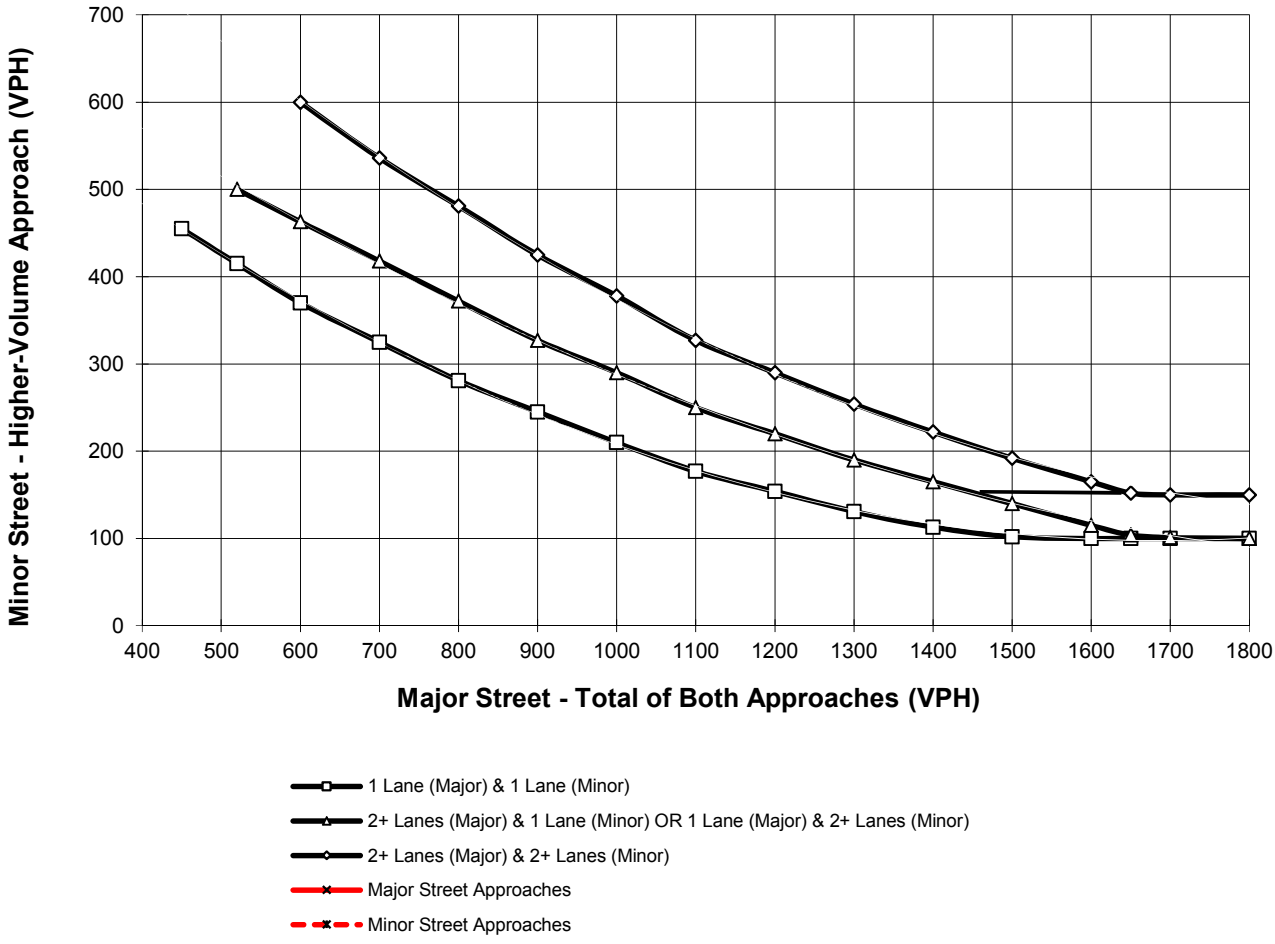
Major Street Name = **15th Street**

Total of Both Approaches (VPH) = **10**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 1**

High Volume Approach (VPH) = **11**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday AM Peak Hour**

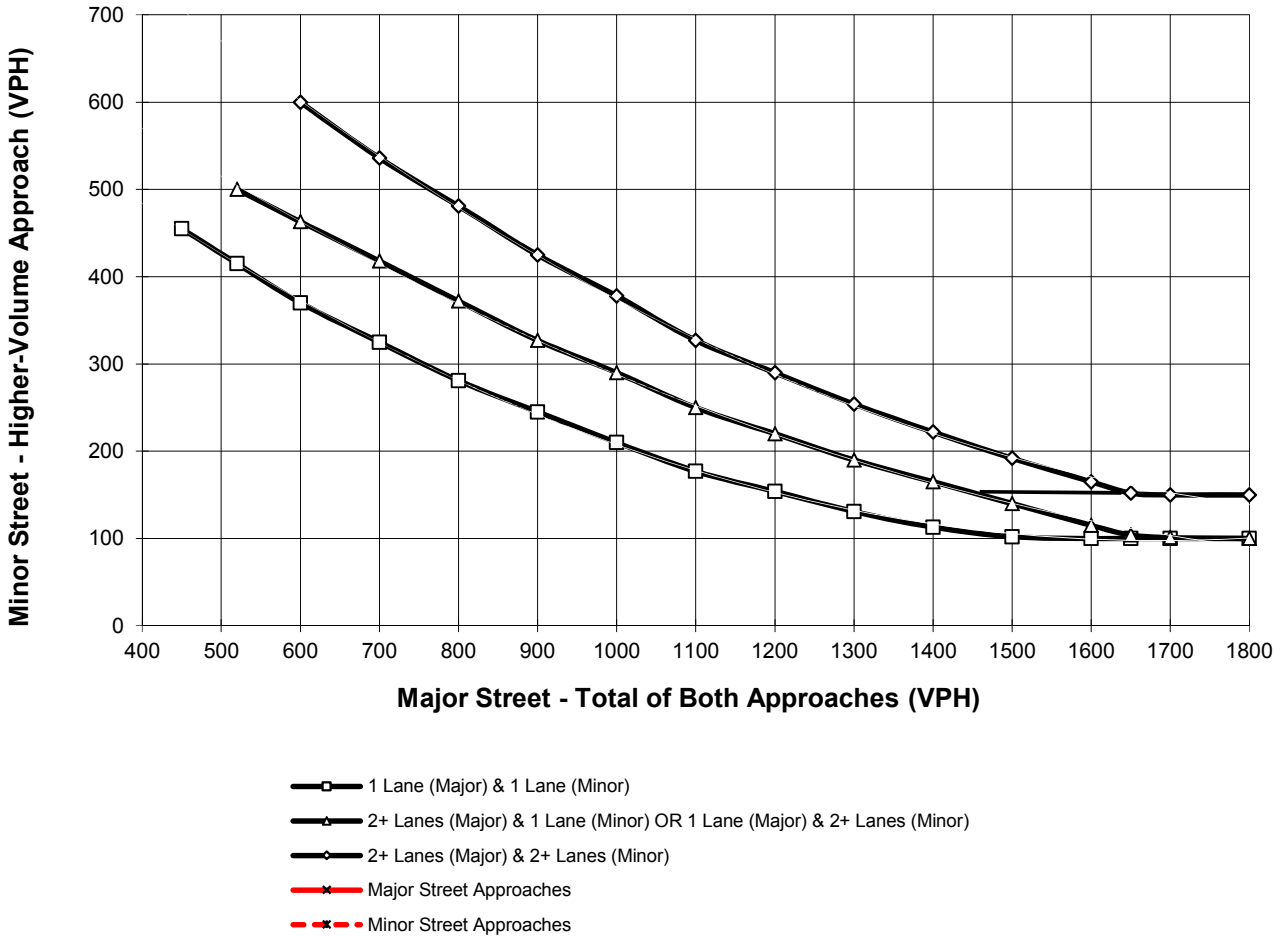
Major Street Name = **15th Street**

Total of Both Approaches (VPH) = **54**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**

High Volume Approach (VPH) = **26**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

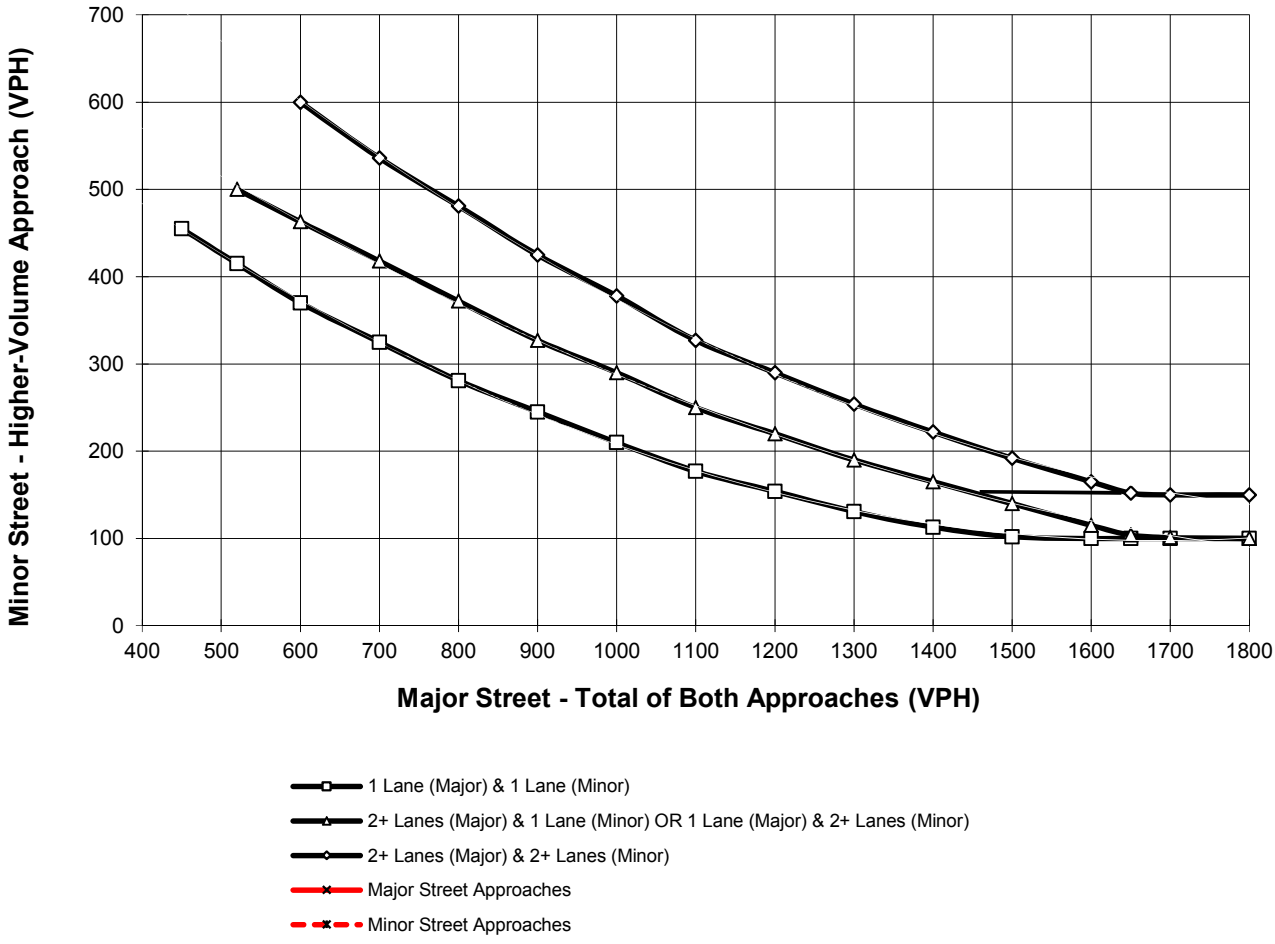
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **76**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **35**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

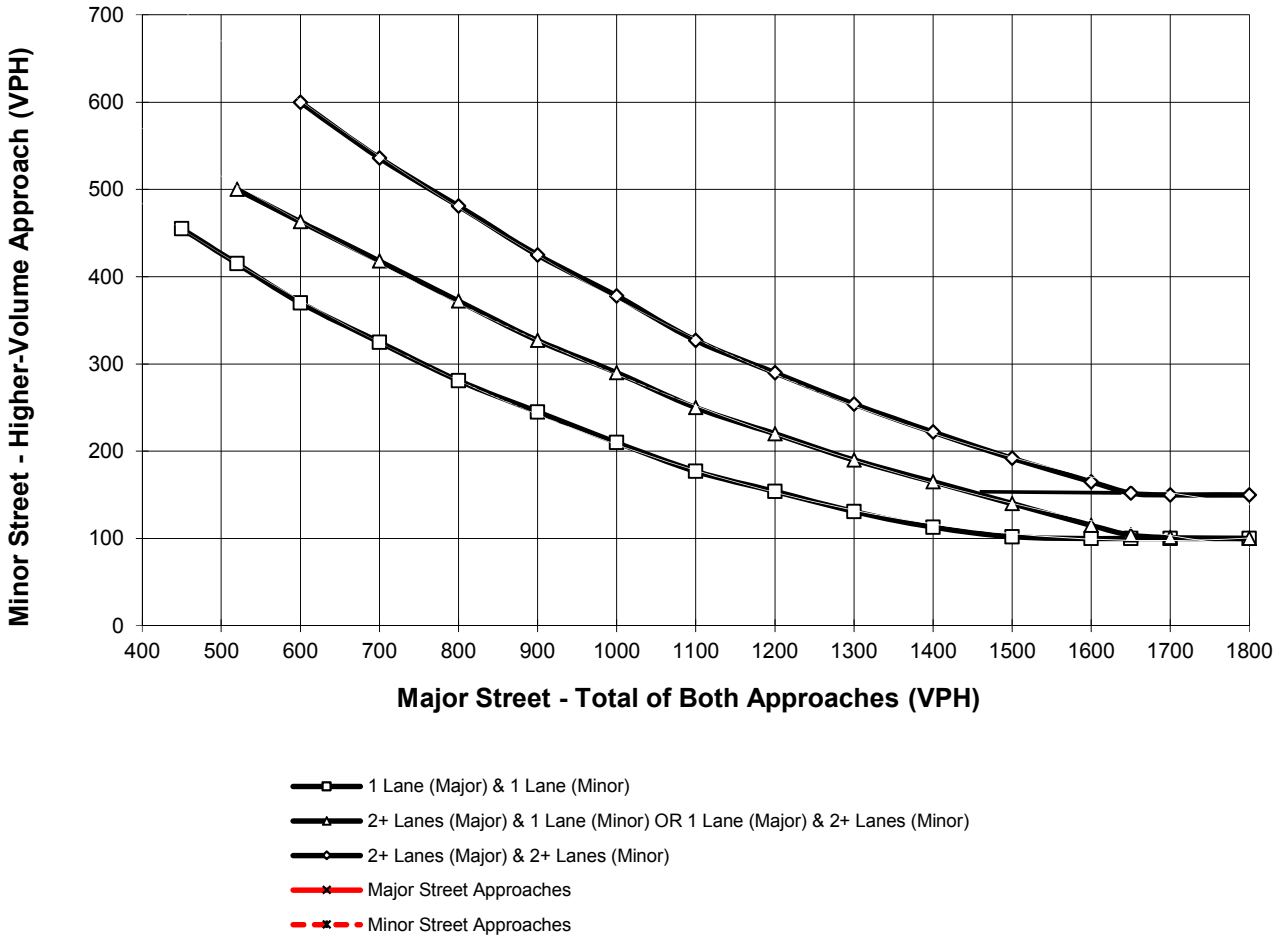
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **E+P Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **248**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **76**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 6.1:

# OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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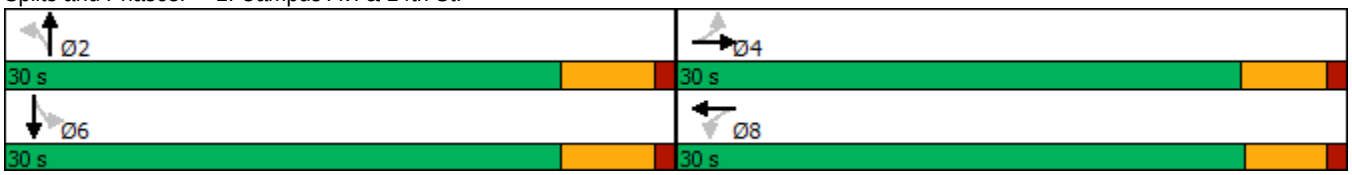
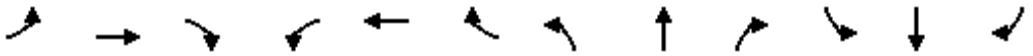
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 76 | 68 | 40 | 134 | 33 | 431 | 115 | 616 |
| Future Volume (vph) | 76 | 68 | 40 | 134 | 33 | 431 | 115 | 616 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 40 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 76 | 68 | 42 | 40 | 134 | 137 | 33 | 431 | 26 | 115 | 616 | 102 |
| Future Volume (veh/h) | 76 | 68 | 42 | 40 | 134 | 137 | 33 | 431 | 26 | 115 | 616 | 102 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.98 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 87 | 78 | 42 | 46 | 154 | 123 | 38 | 495 | 25 | 132 | 708 | 115 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 402 | 359 | 193 | 529 | 305 | 243 | 351 | 1415 | 71 | 471 | 1258 | 204 |
| Arrive On Green | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 |
| Sat Flow, veh/h | 1102 | 1134 | 611 | 1250 | 962 | 769 | 665 | 3442 | 174 | 881 | 3060 | 497 |
| Grp Volume(v), veh/h | 87 | 0 | 120 | 46 | 0 | 277 | 38 | 255 | 265 | 132 | 411 | 412 |
| Grp Sat Flow(s),veh/h/ln | 1102 | 0 | 1744 | 1250 | 0 | 1731 | 665 | 1777 | 1839 | 881 | 1777 | 1780 |
| Q Serve(g_s), s | 2.6 | 0.0 | 1.9 | 1.0 | 0.0 | 4.8 | 1.7 | 3.6 | 3.6 | 4.5 | 6.5 | 6.5 |
| Cycle Q Clear(g_c), s | 7.3 | 0.0 | 1.9 | 2.9 | 0.0 | 4.8 | 8.2 | 3.6 | 3.6 | 8.1 | 6.5 | 6.5 |
| Prop In Lane | 1.00 | | 0.35 | 1.00 | | 0.44 | 1.00 | | 0.09 | 1.00 | | 0.28 |
| Lane Grp Cap(c), veh/h | 402 | 0 | 553 | 529 | 0 | 548 | 351 | 730 | 756 | 471 | 730 | 732 |
| V/C Ratio(X) | 0.22 | 0.00 | 0.22 | 0.09 | 0.00 | 0.51 | 0.11 | 0.35 | 0.35 | 0.28 | 0.56 | 0.56 |
| Avail Cap(c_a), veh/h | 809 | 0 | 1197 | 997 | 0 | 1197 | 527 | 1200 | 1242 | 704 | 1200 | 1202 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.2 | 0.0 | 9.2 | 10.3 | 0.0 | 10.2 | 11.4 | 7.4 | 7.4 | 10.2 | 8.3 | 8.3 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 0.7 | 0.1 | 0.3 | 0.3 | 0.3 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 0.5 | 0.2 | 0.0 | 1.5 | 0.2 | 0.9 | 0.9 | 0.6 | 1.6 | 1.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.5 | 0.0 | 9.4 | 10.3 | 0.0 | 10.9 | 11.6 | 7.7 | 7.7 | 10.6 | 9.0 | 9.0 |
| LnGrp LOS | B | A | A | B | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 207 | | | 323 | | | 558 | | | 955 | |
| Approach Delay, s/veh | | 11.1 | | | 10.8 | | | 8.0 | | | 9.2 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 20.3 | | 16.4 | | 20.3 | | 16.4 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 10.2 | | 9.3 | | 10.1 | | 6.8 | | | | |
| Green Ext Time (p_c), s | | 2.8 | | 0.8 | | 5.0 | | 1.8 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 9.3 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 15 | 19 | 4 | 9 | 14 |
| Future Vol, veh/h | 3 | 15 | 19 | 4 | 9 | 14 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 22 | 28 | 6 | 13 | 20 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 26 | 0 | 77 | 16 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 62 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1588 | - | 926 | 1063 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 961 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1588 | - | 909 | 1062 |
| Mov Cap-2 Maneuver | - | - | - | - | 909 | - |
| Stage 1 | - | - | - | - | 990 | - |
| Stage 2 | - | - | - | - | 961 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 6 | 8.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 996 | - | - | 1588 | - |
| HCM Lane V/C Ratio | 0.033 | - | - | 0.017 | - |
| HCM Control Delay (s) | 8.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 11 | 66 | 68 | 7 | 94 | 2 | 59 | 12 | 4 | 3 | 11 | 29 |
| Future Vol, veh/h | 11 | 66 | 68 | 7 | 94 | 2 | 59 | 12 | 4 | 3 | 11 | 29 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 14 | 85 | 87 | 9 | 121 | 3 | 76 | 15 | 5 | 4 | 14 | 37 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 126 | 0 | 0 | 193 | 0 | 0 | 345 | 322 | 154 | 314 | 364 | 126 |
| Stage 1 | - | - | - | - | - | - | 178 | 178 | - | 143 | 143 | - |
| Stage 2 | - | - | - | - | - | - | 167 | 144 | - | 171 | 221 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1460 | - | - | 1380 | - | - | 609 | 595 | 892 | 639 | 564 | 924 |
| Stage 1 | - | - | - | - | - | - | 824 | 752 | - | 860 | 779 | - |
| Stage 2 | - | - | - | - | - | - | 835 | 778 | - | 831 | 720 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1457 | - | - | 1352 | - | - | 553 | 572 | 871 | 610 | 542 | 921 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 553 | 572 | - | 610 | 542 | - |
| Stage 1 | - | - | - | - | - | - | 798 | 729 | - | 849 | 772 | - |
| Stage 2 | - | - | - | - | - | - | 780 | 771 | - | 797 | 698 | - |

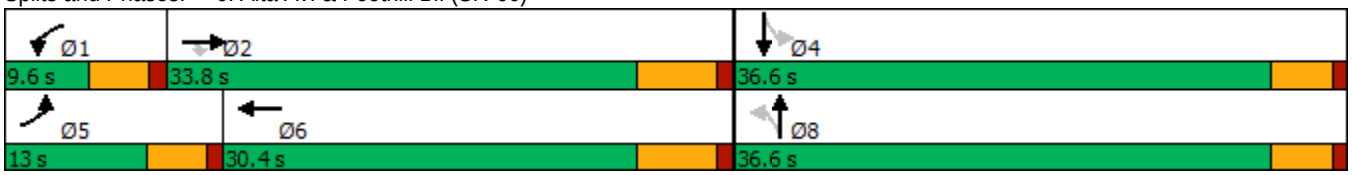
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0.5 | 12.6 | 10.1 |
| HCM LOS | | | B | B |

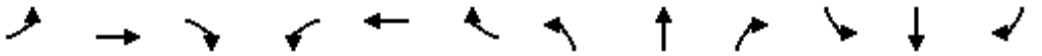
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 567 | 1457 | - | - | 1352 | - | - | 758 |
| HCM Lane V/C Ratio | 0.17 | 0.01 | - | - | 0.007 | - | - | 0.073 |
| HCM Control Delay (s) | 12.6 | 7.5 | 0 | - | 7.7 | 0 | - | 10.1 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.6 | 0 | - | - | 0 | - | - | 0.2 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 130 | 546 | 21 | 14 | 762 | 11 | 6 | 71 | 8 |
| Future Volume (vph) | 130 | 546 | 21 | 14 | 762 | 11 | 6 | 71 | 8 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 59.6 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 130 | 546 | 21 | 14 | 762 | 102 | 11 | 6 | 5 | 71 | 8 | 104 |
| Future Volume (veh/h) | 130 | 546 | 21 | 14 | 762 | 102 | 11 | 6 | 5 | 71 | 8 | 104 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 146 | 613 | 21 | 16 | 856 | 106 | 12 | 7 | 4 | 80 | 9 | 96 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 187 | 1604 | 694 | 36 | 1165 | 144 | 241 | 130 | 55 | 480 | 30 | 324 |
| Arrive On Green | 0.10 | 0.45 | 0.45 | 0.02 | 0.37 | 0.37 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3179 | 394 | 579 | 582 | 244 | 1397 | 136 | 1445 |
| Grp Volume(v), veh/h | 146 | 613 | 21 | 16 | 478 | 484 | 23 | 0 | 0 | 80 | 0 | 105 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1796 | 1406 | 0 | 0 | 1397 | 0 | 1581 |
| Q Serve(g_s), s | 3.9 | 5.6 | 0.4 | 0.4 | 11.5 | 11.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 |
| Cycle Q Clear(g_c), s | 3.9 | 5.6 | 0.4 | 0.4 | 11.5 | 11.5 | 2.7 | 0.0 | 0.0 | 1.8 | 0.0 | 2.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.22 | 0.52 | | 0.17 | 1.00 | | 0.91 |
| Lane Grp Cap(c), veh/h | 187 | 1604 | 694 | 36 | 651 | 658 | 426 | 0 | 0 | 480 | 0 | 354 |
| V/C Ratio(X) | 0.78 | 0.38 | 0.03 | 0.45 | 0.73 | 0.73 | 0.05 | 0.00 | 0.00 | 0.17 | 0.00 | 0.30 |
| Avail Cap(c_a), veh/h | 304 | 2019 | 873 | 181 | 887 | 896 | 1052 | 0 | 0 | 1074 | 0 | 1027 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.5 | 9.0 | 7.5 | 23.9 | 13.5 | 13.5 | 15.0 | 0.0 | 0.0 | 15.5 | 0.0 | 15.9 |
| Incr Delay (d2), s/veh | 2.7 | 0.1 | 0.0 | 3.3 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 1.5 | 0.1 | 0.2 | 3.7 | 3.8 | 0.2 | 0.0 | 0.0 | 0.7 | 0.0 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 24.2 | 9.1 | 7.5 | 27.2 | 15.6 | 15.6 | 15.0 | 0.0 | 0.0 | 15.6 | 0.0 | 16.1 |
| LnGrp LOS | C | A | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 780 | | | 978 | | | 23 | | | 185 | |
| Approach Delay, s/veh | | 11.9 | | | 15.8 | | | 15.0 | | | 15.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.6 | 28.0 | | 15.6 | 9.8 | 23.9 | | 15.6 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.4 | 7.6 | | 4.7 | 5.9 | 13.5 | | 4.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.7 | | 0.5 | 0.0 | 4.3 | | 0.0 | | | | |

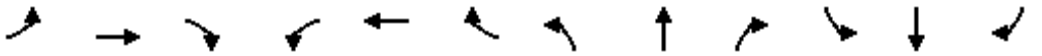
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.2 | |
| HCM 6th LOS | | B | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 416 | 145 | 136 | 726 | 172 | 72 | 158 | 71 | 83 | 14 |
| Future Volume (vph) | 12 | 416 | 145 | 136 | 726 | 172 | 72 | 158 | 71 | 83 | 14 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 100 |
| Actuated Cycle Length: 55 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 416 | 145 | 136 | 726 | 60 | 172 | 72 | 158 | 71 | 83 | 14 |
| Future Volume (veh/h) | 12 | 416 | 145 | 136 | 726 | 60 | 172 | 72 | 158 | 71 | 83 | 14 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 13 | 457 | 135 | 149 | 798 | 57 | 189 | 79 | 144 | 78 | 91 | 3 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 29 | 963 | 426 | 194 | 1220 | 87 | 517 | 581 | 486 | 471 | 1104 | 477 |
| Arrive On Green | 0.02 | 0.27 | 0.27 | 0.11 | 0.36 | 0.36 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1781 | 3554 | 1573 | 1781 | 3357 | 240 | 1267 | 1870 | 1563 | 1157 | 3554 | 1535 |
| Grp Volume(v), veh/h | 13 | 457 | 135 | 149 | 422 | 433 | 189 | 79 | 144 | 78 | 91 | 3 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1573 | 1781 | 1777 | 1820 | 1267 | 1870 | 1563 | 1157 | 1777 | 1535 |
| Q Serve(g_s), s | 0.4 | 5.3 | 3.4 | 4.0 | 9.8 | 9.8 | 6.1 | 1.5 | 3.4 | 2.6 | 0.9 | 0.1 |
| Cycle Q Clear(g_c), s | 0.4 | 5.3 | 3.4 | 4.0 | 9.8 | 9.8 | 7.0 | 1.5 | 3.4 | 4.0 | 0.9 | 0.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.13 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 29 | 963 | 426 | 194 | 645 | 661 | 517 | 581 | 486 | 471 | 1104 | 477 |
| V/C Ratio(X) | 0.44 | 0.47 | 0.32 | 0.77 | 0.65 | 0.65 | 0.37 | 0.14 | 0.30 | 0.17 | 0.08 | 0.01 |
| Avail Cap(c_a), veh/h | 268 | 1968 | 871 | 740 | 1454 | 1490 | 1083 | 1416 | 1184 | 990 | 2698 | 1165 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.9 | 15.0 | 14.3 | 21.3 | 13.1 | 13.1 | 14.4 | 12.2 | 12.9 | 13.6 | 12.0 | 11.7 |
| Incr Delay (d2), s/veh | 3.8 | 0.4 | 0.4 | 2.4 | 1.1 | 1.1 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 1.7 | 1.0 | 1.5 | 3.0 | 3.1 | 1.4 | 0.5 | 1.0 | 0.6 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.7 | 15.3 | 14.7 | 23.7 | 14.2 | 14.2 | 14.6 | 12.2 | 13.0 | 13.7 | 12.0 | 11.7 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 605 | | | 1004 | | | 412 | | | 172 | |
| Approach Delay, s/veh | | 15.5 | | | 15.6 | | | 13.6 | | | 12.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.9 | 19.1 | | 20.1 | 5.4 | 23.6 | | 20.1 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.0 | 7.3 | | 6.0 | 2.4 | 11.8 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.1 | 3.1 | | 0.5 | 0.0 | 5.3 | | 0.8 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 15.0 | |
| HCM 6th LOS | | B | |

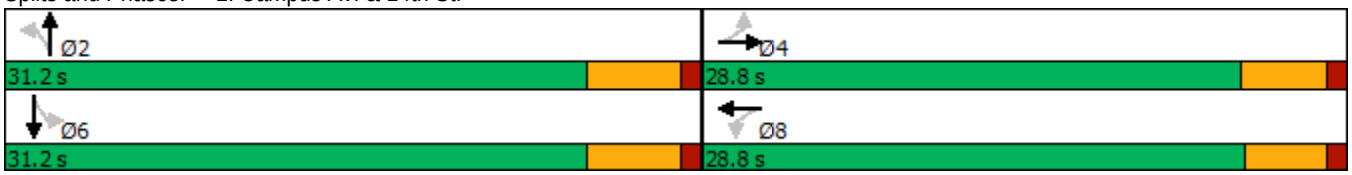
Notes

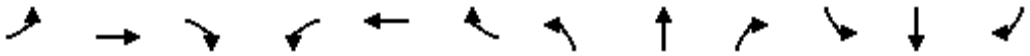
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 97 | 126 | 35 | 76 | 26 | 799 | 138 | 560 |
| Future Volume (vph) | 97 | 126 | 35 | 76 | 26 | 799 | 138 | 560 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 44.2 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 97 | 126 | 21 | 35 | 76 | 113 | 26 | 799 | 53 | 138 | 560 | 58 |
| Future Volume (veh/h) | 97 | 126 | 21 | 35 | 76 | 113 | 26 | 799 | 53 | 138 | 560 | 58 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 103 | 134 | 16 | 37 | 81 | 90 | 28 | 850 | 47 | 147 | 596 | 58 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 382 | 412 | 49 | 406 | 204 | 227 | 481 | 1717 | 95 | 386 | 1643 | 160 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1214 | 1636 | 195 | 1233 | 809 | 899 | 778 | 3419 | 189 | 621 | 3272 | 318 |
| Grp Volume(v), veh/h | 103 | 0 | 150 | 37 | 0 | 171 | 28 | 442 | 455 | 147 | 323 | 331 |
| Grp Sat Flow(s),veh/h/ln | 1214 | 0 | 1831 | 1233 | 0 | 1709 | 778 | 1777 | 1832 | 621 | 1777 | 1813 |
| Q Serve(g_s), s | 3.1 | 0.0 | 2.7 | 1.0 | 0.0 | 3.4 | 0.9 | 6.7 | 6.7 | 8.4 | 4.5 | 4.5 |
| Cycle Q Clear(g_c), s | 6.5 | 0.0 | 2.7 | 3.7 | 0.0 | 3.4 | 5.4 | 6.7 | 6.7 | 15.1 | 4.5 | 4.5 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 0.53 | 1.00 | | 0.10 | 1.00 | | 0.18 |
| Lane Grp Cap(c), veh/h | 382 | 0 | 462 | 406 | 0 | 431 | 481 | 892 | 920 | 386 | 892 | 910 |
| V/C Ratio(X) | 0.27 | 0.00 | 0.32 | 0.09 | 0.00 | 0.40 | 0.06 | 0.49 | 0.50 | 0.38 | 0.36 | 0.36 |
| Avail Cap(c_a), veh/h | 792 | 0 | 1079 | 828 | 0 | 1016 | 587 | 1135 | 1170 | 471 | 1135 | 1158 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.4 | 0.0 | 12.4 | 13.9 | 0.0 | 12.7 | 7.8 | 6.7 | 6.7 | 11.7 | 6.2 | 6.2 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.4 | 0.1 | 0.0 | 0.6 | 0.0 | 0.4 | 0.4 | 0.6 | 0.2 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.0 | 0.9 | 0.3 | 0.0 | 1.2 | 0.1 | 1.4 | 1.5 | 0.9 | 1.0 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.7 | 0.0 | 12.8 | 14.0 | 0.0 | 13.2 | 7.9 | 7.1 | 7.1 | 12.3 | 6.4 | 6.4 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 253 | | | 208 | | | 925 | | | 801 | |
| Approach Delay, s/veh | | 14.0 | | | 13.4 | | | 7.2 | | | 7.5 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 25.6 | | 15.1 | | 25.6 | | 15.1 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 8.7 | | 8.5 | | 17.1 | | 5.7 | | | | |
| Green Ext Time (p_c), s | | 5.2 | | 1.0 | | 3.4 | | 1.1 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 8.7 |
| HCM 6th LOS | | A |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 3 | 7 | 7 | 7 | 11 |
| Future Vol, veh/h | 6 | 3 | 7 | 7 | 7 | 11 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 3 | 8 | 8 | 8 | 13 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 10 | 0 | 33 | 9 |
| Stage 1 | - | - | - | - | 9 | - |
| Stage 2 | - | - | - | - | 24 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1610 | - | 980 | 1073 |
| Stage 1 | - | - | - | - | 1014 | - |
| Stage 2 | - | - | - | - | 999 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1610 | - | 975 | 1073 |
| Mov Cap-2 Maneuver | - | - | - | - | 975 | - |
| Stage 1 | - | - | - | - | 1009 | - |
| Stage 2 | - | - | - | - | 999 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.6 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1033 | - | - | 1610 | - |
| HCM Lane V/C Ratio | 0.02 | - | - | 0.005 | - |
| HCM Control Delay (s) | 8.6 | - | - | 7.2 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 20 | 113 | 38 | 2 | 105 | 3 | 44 | 10 | 3 | 1 | 3 | 14 |
| Future Vol, veh/h | 20 | 113 | 38 | 2 | 105 | 3 | 44 | 10 | 3 | 1 | 3 | 14 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 131 | 44 | 2 | 122 | 3 | 51 | 12 | 3 | 1 | 3 | 16 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 126 | 0 | 0 | 178 | 0 | 0 | 339 | 332 | 156 | 336 | 353 | 125 |
| Stage 1 | - | - | - | - | - | - | 202 | 202 | - | 129 | 129 | - |
| Stage 2 | - | - | - | - | - | - | 137 | 130 | - | 207 | 224 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1460 | - | - | 1398 | - | - | 615 | 588 | 890 | 618 | 572 | 926 |
| Stage 1 | - | - | - | - | - | - | 800 | 734 | - | 875 | 789 | - |
| Stage 2 | - | - | - | - | - | - | 866 | 789 | - | 795 | 718 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1459 | - | - | 1394 | - | - | 590 | 574 | 887 | 596 | 558 | 925 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 590 | 574 | - | 596 | 558 | - |
| Stage 1 | - | - | - | - | - | - | 783 | 719 | - | 858 | 787 | - |
| Stage 2 | - | - | - | - | - | - | 845 | 787 | - | 765 | 703 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.9 | 0.1 | 11.8 | 9.6 |
| HCM LOS | | | B | A |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 598 | 1459 | - | - | 1394 | - | - | 811 |
| HCM Lane V/C Ratio | 0.111 | 0.016 | - | - | 0.002 | - | - | 0.026 |
| HCM Control Delay (s) | 11.8 | 7.5 | 0 | - | 7.6 | 0 | - | 9.6 |
| HCM Lane LOS | B | A | A | - | A | A | - | A |
| HCM 95th %tile Q(veh) | 0.4 | 0 | - | - | 0 | - | - | 0.1 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 98 | 1382 | 19 | 16 | 873 | 14 | 9 | 79 | 11 |
| Future Volume (vph) | 98 | 1382 | 19 | 16 | 873 | 14 | 9 | 79 | 11 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 61.4 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 98 | 1382 | 19 | 16 | 873 | 41 | 14 | 9 | 19 | 79 | 11 | 110 |
| Future Volume (veh/h) | 98 | 1382 | 19 | 16 | 873 | 41 | 14 | 9 | 19 | 79 | 11 | 110 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.98 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 104 | 1470 | 19 | 17 | 929 | 40 | 15 | 10 | 8 | 84 | 12 | 61 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 134 | 1840 | 796 | 37 | 1607 | 69 | 207 | 133 | 82 | 420 | 57 | 291 |
| Arrive On Green | 0.08 | 0.52 | 0.52 | 0.02 | 0.46 | 0.46 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1538 | 1781 | 3469 | 149 | 563 | 617 | 378 | 1375 | 265 | 1347 |
| Grp Volume(v), veh/h | 104 | 1470 | 19 | 17 | 476 | 493 | 33 | 0 | 0 | 84 | 0 | 73 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1538 | 1781 | 1777 | 1841 | 1558 | 0 | 0 | 1375 | 0 | 1612 |
| Q Serve(g_s), s | 3.5 | 20.8 | 0.4 | 0.6 | 12.0 | 12.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 2.3 |
| Cycle Q Clear(g_c), s | 3.5 | 20.8 | 0.4 | 0.6 | 12.0 | 12.0 | 0.9 | 0.0 | 0.0 | 2.8 | 0.0 | 2.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.08 | 0.45 | | 0.24 | 1.00 | | 0.84 |
| Lane Grp Cap(c), veh/h | 134 | 1840 | 796 | 37 | 823 | 853 | 422 | 0 | 0 | 420 | 0 | 348 |
| V/C Ratio(X) | 0.78 | 0.80 | 0.02 | 0.47 | 0.58 | 0.58 | 0.08 | 0.00 | 0.00 | 0.20 | 0.00 | 0.21 |
| Avail Cap(c_a), veh/h | 245 | 2214 | 958 | 146 | 1008 | 1044 | 888 | 0 | 0 | 845 | 0 | 846 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.7 | 12.1 | 7.2 | 29.5 | 12.0 | 12.0 | 19.1 | 0.0 | 0.0 | 19.8 | 0.0 | 19.6 |
| Incr Delay (d2), s/veh | 3.7 | 1.8 | 0.0 | 3.4 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 6.2 | 0.1 | 0.3 | 3.7 | 3.9 | 0.4 | 0.0 | 0.0 | 1.0 | 0.0 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 31.4 | 13.9 | 7.2 | 32.9 | 12.6 | 12.6 | 19.1 | 0.0 | 0.0 | 19.9 | 0.0 | 19.8 |
| LnGrp LOS | C | B | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1593 | | | 986 | | | 33 | | | 157 | |
| Approach Delay, s/veh | | 15.0 | | | 13.0 | | | 19.1 | | | 19.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.9 | 37.4 | | 17.8 | 9.2 | 34.1 | | 17.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.6 | 22.8 | | 4.8 | 5.5 | 14.0 | | 2.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 8.8 | | 0.4 | 0.0 | 5.7 | | 0.1 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 14.6 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

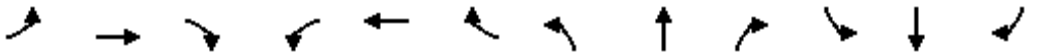
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 1172 | 220 | 101 | 739 | 191 | 162 | 220 | 156 | 139 | 22 |
| Future Volume (vph) | 25 | 1172 | 220 | 101 | 739 | 191 | 162 | 220 | 156 | 139 | 22 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 76.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 25 | 1172 | 220 | 101 | 739 | 92 | 191 | 162 | 220 | 156 | 139 | 22 |
| Future Volume (veh/h) | 25 | 1172 | 220 | 101 | 739 | 92 | 191 | 162 | 220 | 156 | 139 | 22 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 27 | 1247 | 193 | 107 | 786 | 78 | 203 | 172 | 160 | 166 | 148 | 10 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 51 | 1548 | 680 | 137 | 1575 | 156 | 407 | 539 | 457 | 321 | 1025 | 444 |
| Arrive On Green | 0.03 | 0.44 | 0.44 | 0.08 | 0.48 | 0.48 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3257 | 323 | 1214 | 1870 | 1585 | 1048 | 3554 | 1541 |
| Grp Volume(v), veh/h | 27 | 1247 | 193 | 107 | 429 | 435 | 203 | 172 | 160 | 166 | 148 | 10 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1803 | 1214 | 1870 | 1585 | 1048 | 1777 | 1541 |
| Q Serve(g_s), s | 1.1 | 23.3 | 6.1 | 4.5 | 12.5 | 12.5 | 11.4 | 5.5 | 6.1 | 11.2 | 2.4 | 0.4 |
| Cycle Q Clear(g_c), s | 1.1 | 23.3 | 6.1 | 4.5 | 12.5 | 12.5 | 13.7 | 5.5 | 6.1 | 16.7 | 2.4 | 0.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.18 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 51 | 1548 | 680 | 137 | 859 | 872 | 407 | 539 | 457 | 321 | 1025 | 444 |
| V/C Ratio(X) | 0.53 | 0.81 | 0.28 | 0.78 | 0.50 | 0.50 | 0.50 | 0.32 | 0.35 | 0.52 | 0.14 | 0.02 |
| Avail Cap(c_a), veh/h | 133 | 1888 | 830 | 220 | 1030 | 1046 | 613 | 856 | 726 | 500 | 1632 | 707 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.5 | 18.7 | 13.9 | 34.6 | 13.4 | 13.4 | 25.2 | 21.3 | 21.5 | 27.8 | 20.1 | 19.4 |
| Incr Delay (d2), s/veh | 3.2 | 2.2 | 0.2 | 3.7 | 0.4 | 0.4 | 0.4 | 0.1 | 0.2 | 0.5 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 8.5 | 1.9 | 2.0 | 4.3 | 4.3 | 3.1 | 2.2 | 2.1 | 2.7 | 0.9 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.7 | 20.9 | 14.1 | 38.2 | 13.8 | 13.8 | 25.6 | 21.4 | 21.6 | 28.3 | 20.2 | 19.4 |
| LnGrp LOS | D | C | B | D | B | B | C | C | C | C | C | B |
| Approach Vol, veh/h | | 1467 | | | 971 | | | 535 | | | 324 | |
| Approach Delay, s/veh | | 20.4 | | | 16.5 | | | 23.1 | | | 24.3 | |
| Approach LOS | | C | | | B | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.4 | 39.0 | | 26.8 | 6.8 | 42.7 | | 26.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.5 | 25.3 | | 18.7 | 3.1 | 14.5 | | 15.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 7.9 | | 1.0 | 0.0 | 5.4 | | 1.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 20.1 | |
| HCM 6th LOS | | C | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 6.2:

# OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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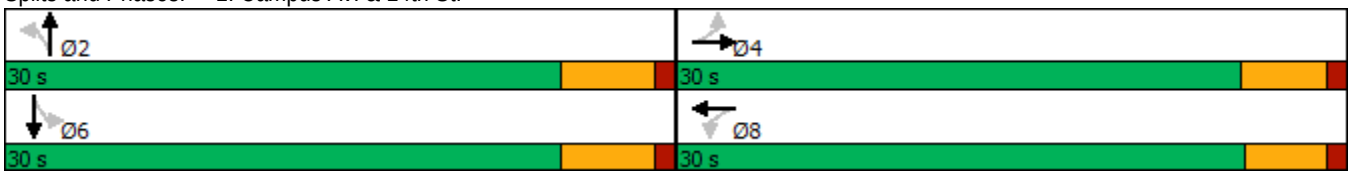
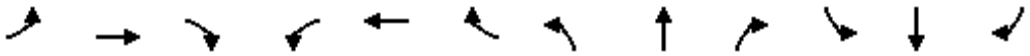
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 76 | 70 | 47 | 140 | 33 | 431 | 120 | 616 |
| Future Volume (vph) | 76 | 70 | 47 | 140 | 33 | 431 | 120 | 616 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 40.3 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 76 | 70 | 42 | 47 | 140 | 152 | 33 | 431 | 29 | 120 | 616 | 102 |
| Future Volume (veh/h) | 76 | 70 | 42 | 47 | 140 | 152 | 33 | 431 | 29 | 120 | 616 | 102 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.98 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 87 | 80 | 42 | 54 | 161 | 141 | 38 | 495 | 28 | 138 | 708 | 115 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 387 | 374 | 196 | 534 | 300 | 263 | 344 | 1404 | 79 | 462 | 1256 | 204 |
| Arrive On Green | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 |
| Sat Flow, veh/h | 1077 | 1145 | 601 | 1248 | 919 | 805 | 665 | 3419 | 193 | 879 | 3060 | 497 |
| Grp Volume(v), veh/h | 87 | 0 | 122 | 54 | 0 | 302 | 38 | 257 | 266 | 138 | 411 | 412 |
| Grp Sat Flow(s),veh/h/ln | 1077 | 0 | 1747 | 1248 | 0 | 1725 | 665 | 1777 | 1835 | 879 | 1777 | 1780 |
| Q Serve(g_s), s | 2.7 | 0.0 | 1.9 | 1.2 | 0.0 | 5.4 | 1.8 | 3.8 | 3.8 | 4.9 | 6.7 | 6.8 |
| Cycle Q Clear(g_c), s | 8.2 | 0.0 | 1.9 | 3.2 | 0.0 | 5.4 | 8.5 | 3.8 | 3.8 | 8.7 | 6.7 | 6.8 |
| Prop In Lane | 1.00 | | 0.34 | 1.00 | | 0.47 | 1.00 | | 0.11 | 1.00 | | 0.28 |
| Lane Grp Cap(c), veh/h | 387 | 0 | 571 | 534 | 0 | 563 | 344 | 729 | 753 | 462 | 729 | 731 |
| V/C Ratio(X) | 0.22 | 0.00 | 0.21 | 0.10 | 0.00 | 0.54 | 0.11 | 0.35 | 0.35 | 0.30 | 0.56 | 0.56 |
| Avail Cap(c_a), veh/h | 749 | 0 | 1157 | 960 | 0 | 1151 | 505 | 1158 | 1196 | 674 | 1158 | 1160 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.8 | 0.0 | 9.3 | 10.4 | 0.0 | 10.5 | 11.9 | 7.7 | 7.7 | 10.7 | 8.6 | 8.6 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 0.8 | 0.1 | 0.3 | 0.3 | 0.4 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.6 | 0.0 | 0.6 | 0.3 | 0.0 | 1.8 | 0.2 | 0.9 | 1.0 | 0.7 | 1.7 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.1 | 0.0 | 9.5 | 10.5 | 0.0 | 11.3 | 12.0 | 8.0 | 8.0 | 11.1 | 9.3 | 9.3 |
| LnGrp LOS | B | A | A | B | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 209 | | | 356 | | | 561 | | | 961 | |
| Approach Delay, s/veh | | 11.4 | | | 11.1 | | | 8.3 | | | 9.5 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 20.8 | | 17.2 | | 20.8 | | 17.2 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 10.5 | | 10.2 | | 10.7 | | 7.4 | | | | |
| Green Ext Time (p_c), s | | 2.8 | | 0.8 | | 4.9 | | 2.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 9.7 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Future Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 3 | 4 | 12 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 7 | 0 | - | 0 | 8 | 5 |
| Stage 1 | - | - | - | - | 5 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Mov Cap-2 Maneuver | - | - | - | - | 1013 | - |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1614 | - | - | - | 1013 |
| HCM Lane V/C Ratio | - | - | - | - | 0.012 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 29 | 18 | 9 | 26 | 0 |
| Future Vol, veh/h | 0 | 29 | 18 | 9 | 26 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 32 | 20 | 10 | 28 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 30 | 0 | - | 0 | 57 | 25 |
| Stage 1 | - | - | - | - | 25 | - |
| Stage 2 | - | - | - | - | 32 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1583 | - | - | - | 950 | 1051 |
| Stage 1 | - | - | - | - | 998 | - |
| Stage 2 | - | - | - | - | 991 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1583 | - | - | - | 950 | 1051 |
| Mov Cap-2 Maneuver | - | - | - | - | 950 | - |
| Stage 1 | - | - | - | - | 998 | - |
| Stage 2 | - | - | - | - | 991 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1583 | - | - | - | 950 |
| HCM Lane V/C Ratio | - | - | - | - | 0.03 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 52 | 19 | 4 | 22 | 14 |
| Future Vol, veh/h | 3 | 52 | 19 | 4 | 22 | 14 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 75 | 28 | 6 | 32 | 20 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 79 | 0 | 104 | 43 |
| Stage 1 | - | - | - | - | 42 | - |
| Stage 2 | - | - | - | - | 62 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1519 | - | 894 | 1027 |
| Stage 1 | - | - | - | - | 980 | - |
| Stage 2 | - | - | - | - | 961 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1519 | - | 878 | 1026 |
| Mov Cap-2 Maneuver | - | - | - | - | 878 | - |
| Stage 1 | - | - | - | - | 962 | - |
| Stage 2 | - | - | - | - | 961 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 6.1 | 9.1 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 930 | - | - | 1519 | - |
| HCM Lane V/C Ratio | 0.056 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 21 | 66 | 68 | 7 | 94 | 2 | 59 | 15 | 4 | 3 | 20 | 57 |
| Future Vol, veh/h | 21 | 66 | 68 | 7 | 94 | 2 | 59 | 15 | 4 | 3 | 20 | 57 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 27 | 85 | 87 | 9 | 121 | 3 | 76 | 19 | 5 | 4 | 26 | 73 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 126 | 0 | 0 | 193 | 0 | 0 | 395 | 348 | 154 | 342 | 390 | 126 |
| Stage 1 | - | - | - | - | - | - | 204 | 204 | - | 143 | 143 | - |
| Stage 2 | - | - | - | - | - | - | 191 | 144 | - | 199 | 247 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1460 | - | - | 1380 | - | - | 565 | 576 | 892 | 612 | 545 | 924 |
| Stage 1 | - | - | - | - | - | - | 798 | 733 | - | 860 | 779 | - |
| Stage 2 | - | - | - | - | - | - | 811 | 778 | - | 803 | 702 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1457 | - | - | 1352 | - | - | 480 | 548 | 871 | 577 | 518 | 921 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 480 | 548 | - | 577 | 518 | - |
| Stage 1 | - | - | - | - | - | - | 765 | 703 | - | 840 | 772 | - |
| Stage 2 | - | - | - | - | - | - | 716 | 771 | - | 757 | 673 | - |

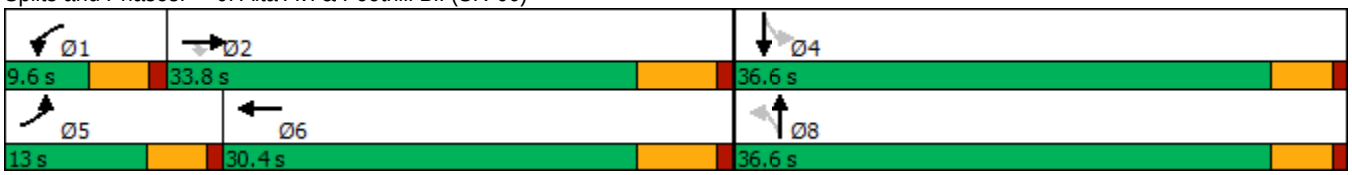
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1 | 0.5 | 13.9 | 10.5 |
| HCM LOS | | | B | B |

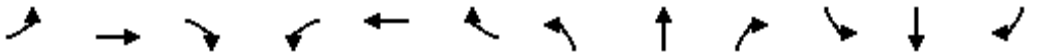
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 504 | 1457 | - | - | 1352 | - | - | 757 |
| HCM Lane V/C Ratio | 0.198 | 0.018 | - | - | 0.007 | - | - | 0.135 |
| HCM Control Delay (s) | 13.9 | 7.5 | 0 | - | 7.7 | 0 | - | 10.5 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.7 | 0.1 | - | - | 0 | - | - | 0.5 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 130 | 546 | 21 | 14 | 762 | 11 | 6 | 80 | 8 |
| Future Volume (vph) | 130 | 546 | 21 | 14 | 762 | 11 | 6 | 80 | 8 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 59.7 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 130 | 546 | 21 | 14 | 762 | 105 | 11 | 6 | 5 | 80 | 8 | 104 |
| Future Volume (veh/h) | 130 | 546 | 21 | 14 | 762 | 105 | 11 | 6 | 5 | 80 | 8 | 104 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 146 | 613 | 21 | 16 | 856 | 109 | 12 | 7 | 4 | 90 | 9 | 96 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 187 | 1607 | 695 | 36 | 1163 | 148 | 241 | 130 | 55 | 480 | 30 | 324 |
| Arrive On Green | 0.10 | 0.45 | 0.45 | 0.02 | 0.37 | 0.37 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1537 | 1781 | 3167 | 403 | 579 | 582 | 244 | 1397 | 136 | 1445 |
| Grp Volume(v), veh/h | 146 | 613 | 21 | 16 | 480 | 485 | 23 | 0 | 0 | 90 | 0 | 105 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1537 | 1781 | 1777 | 1794 | 1405 | 0 | 0 | 1397 | 0 | 1581 |
| Q Serve(g_s), s | 3.9 | 5.6 | 0.4 | 0.4 | 11.6 | 11.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 |
| Cycle Q Clear(g_c), s | 3.9 | 5.6 | 0.4 | 0.4 | 11.6 | 11.6 | 2.7 | 0.0 | 0.0 | 2.0 | 0.0 | 2.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.22 | 0.52 | | 0.17 | 1.00 | | 0.91 |
| Lane Grp Cap(c), veh/h | 187 | 1607 | 695 | 36 | 652 | 659 | 426 | 0 | 0 | 480 | 0 | 354 |
| V/C Ratio(X) | 0.78 | 0.38 | 0.03 | 0.45 | 0.74 | 0.74 | 0.05 | 0.00 | 0.00 | 0.19 | 0.00 | 0.30 |
| Avail Cap(c_a), veh/h | 303 | 2017 | 872 | 181 | 886 | 894 | 1051 | 0 | 0 | 1073 | 0 | 1025 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.5 | 9.0 | 7.5 | 23.9 | 13.5 | 13.5 | 15.1 | 0.0 | 0.0 | 15.7 | 0.0 | 15.9 |
| Incr Delay (d2), s/veh | 2.7 | 0.1 | 0.0 | 3.3 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 1.5 | 0.1 | 0.2 | 3.7 | 3.8 | 0.2 | 0.0 | 0.0 | 0.8 | 0.0 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 24.2 | 9.1 | 7.5 | 27.2 | 15.7 | 15.7 | 15.1 | 0.0 | 0.0 | 15.7 | 0.0 | 16.1 |
| LnGrp LOS | C | A | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 780 | | | 981 | | | 23 | | | 195 | |
| Approach Delay, s/veh | | 11.9 | | | 15.8 | | | 15.1 | | | 15.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.6 | 28.1 | | 15.7 | 9.8 | 23.9 | | 15.7 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.4 | 7.6 | | 4.7 | 5.9 | 13.6 | | 4.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.7 | | 0.5 | 0.0 | 4.3 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.3 | |
| HCM 6th LOS | | B | |

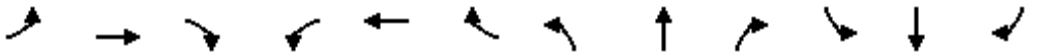
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 422 | 149 | 136 | 728 | 173 | 72 | 158 | 71 | 83 | 14 |
| Future Volume (vph) | 12 | 422 | 149 | 136 | 728 | 173 | 72 | 158 | 71 | 83 | 14 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 55.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 12 | 422 | 149 | 136 | 728 | 60 | 173 | 72 | 158 | 71 | 83 | 14 |
| Future Volume (veh/h) | 12 | 422 | 149 | 136 | 728 | 60 | 173 | 72 | 158 | 71 | 83 | 14 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 13 | 464 | 140 | 149 | 800 | 57 | 190 | 79 | 144 | 78 | 91 | 3 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 29 | 965 | 427 | 194 | 1222 | 87 | 517 | 581 | 486 | 471 | 1104 | 477 |
| Arrive On Green | 0.02 | 0.27 | 0.27 | 0.11 | 0.36 | 0.36 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1781 | 3554 | 1573 | 1781 | 3358 | 239 | 1267 | 1870 | 1563 | 1157 | 3554 | 1535 |
| Grp Volume(v), veh/h | 13 | 464 | 140 | 149 | 423 | 434 | 190 | 79 | 144 | 78 | 91 | 3 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1573 | 1781 | 1777 | 1820 | 1267 | 1870 | 1563 | 1157 | 1777 | 1535 |
| Q Serve(g_s), s | 0.4 | 5.4 | 3.5 | 4.0 | 9.8 | 9.8 | 6.1 | 1.5 | 3.4 | 2.6 | 0.9 | 0.1 |
| Cycle Q Clear(g_c), s | 0.4 | 5.4 | 3.5 | 4.0 | 9.8 | 9.8 | 7.0 | 1.5 | 3.4 | 4.1 | 0.9 | 0.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.13 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 29 | 965 | 427 | 194 | 646 | 662 | 517 | 581 | 486 | 471 | 1104 | 477 |
| V/C Ratio(X) | 0.44 | 0.48 | 0.33 | 0.77 | 0.65 | 0.66 | 0.37 | 0.14 | 0.30 | 0.17 | 0.08 | 0.01 |
| Avail Cap(c_a), veh/h | 268 | 1966 | 870 | 739 | 1453 | 1488 | 1082 | 1415 | 1183 | 989 | 2696 | 1164 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 24.0 | 15.0 | 14.3 | 21.3 | 13.1 | 13.1 | 14.5 | 12.2 | 12.9 | 13.7 | 12.0 | 11.7 |
| Incr Delay (d2), s/veh | 3.8 | 0.4 | 0.4 | 2.4 | 1.1 | 1.1 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 1.8 | 1.0 | 1.5 | 3.0 | 3.1 | 1.4 | 0.5 | 1.0 | 0.6 | 0.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.8 | 15.4 | 14.8 | 23.8 | 14.2 | 14.2 | 14.6 | 12.2 | 13.0 | 13.7 | 12.0 | 11.7 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 617 | | | 1006 | | | 413 | | | 172 | |
| Approach Delay, s/veh | | 15.5 | | | 15.6 | | | 13.6 | | | 12.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.9 | 19.2 | | 20.1 | 5.4 | 23.7 | | 20.1 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.0 | 7.4 | | 6.1 | 2.4 | 11.8 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.1 | 3.1 | | 0.5 | 0.0 | 5.3 | | 0.8 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 15.0 | |
| HCM 6th LOS | | B | |

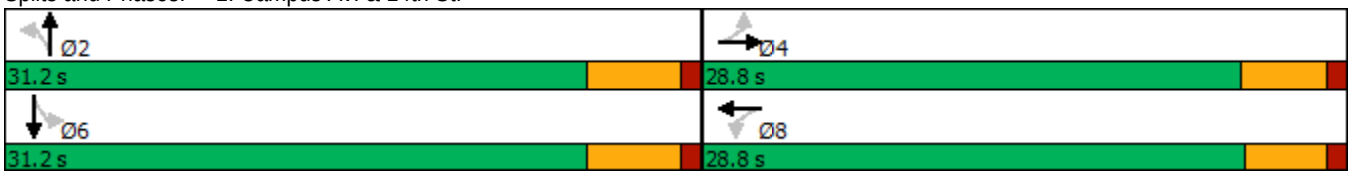
Notes

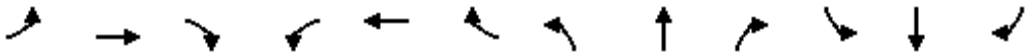
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 97 | 132 | 40 | 80 | 26 | 799 | 154 | 560 |
| Future Volume (vph) | 97 | 132 | 40 | 80 | 26 | 799 | 154 | 560 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 48.5 |
| Natural Cycle: 65 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 97 | 132 | 21 | 40 | 80 | 123 | 26 | 799 | 61 | 154 | 560 | 58 |
| Future Volume (veh/h) | 97 | 132 | 21 | 40 | 80 | 123 | 26 | 799 | 61 | 154 | 560 | 58 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 103 | 140 | 16 | 43 | 85 | 101 | 28 | 850 | 56 | 164 | 596 | 58 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 357 | 409 | 47 | 389 | 193 | 230 | 487 | 1742 | 115 | 387 | 1687 | 164 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 |
| Sat Flow, veh/h | 1198 | 1644 | 188 | 1227 | 779 | 925 | 778 | 3379 | 223 | 615 | 3272 | 318 |
| Grp Volume(v), veh/h | 103 | 0 | 156 | 43 | 0 | 186 | 28 | 447 | 459 | 164 | 323 | 331 |
| Grp Sat Flow(s),veh/h/ln | 1198 | 0 | 1832 | 1227 | 0 | 1704 | 778 | 1777 | 1825 | 615 | 1777 | 1813 |
| Q Serve(g_s), s | 3.4 | 0.0 | 3.0 | 1.3 | 0.0 | 3.9 | 0.9 | 6.9 | 6.9 | 10.0 | 4.6 | 4.6 |
| Cycle Q Clear(g_c), s | 7.3 | 0.0 | 3.0 | 4.2 | 0.0 | 3.9 | 5.5 | 6.9 | 6.9 | 16.9 | 4.6 | 4.6 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.54 | 1.00 | | 0.12 | 1.00 | | 0.18 |
| Lane Grp Cap(c), veh/h | 357 | 0 | 455 | 389 | 0 | 423 | 487 | 916 | 941 | 387 | 916 | 935 |
| V/C Ratio(X) | 0.29 | 0.00 | 0.34 | 0.11 | 0.00 | 0.44 | 0.06 | 0.49 | 0.49 | 0.42 | 0.35 | 0.35 |
| Avail Cap(c_a), veh/h | 738 | 0 | 1038 | 785 | 0 | 973 | 563 | 1090 | 1120 | 447 | 1090 | 1112 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.5 | 0.0 | 13.1 | 14.8 | 0.0 | 13.4 | 7.7 | 6.6 | 6.6 | 12.1 | 6.1 | 6.1 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.4 | 0.1 | 0.0 | 0.7 | 0.0 | 0.4 | 0.4 | 0.7 | 0.2 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.0 | 1.0 | 0.3 | 0.0 | 1.4 | 0.1 | 1.5 | 1.6 | 1.0 | 1.0 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.9 | 0.0 | 13.5 | 14.9 | 0.0 | 14.2 | 7.8 | 7.0 | 7.0 | 12.8 | 6.3 | 6.3 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 259 | | | 229 | | | 934 | | | 818 | |
| Approach Delay, s/veh | | 14.9 | | | 14.3 | | | 7.1 | | | 7.6 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 27.0 | | 15.3 | | 27.0 | | 15.3 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 8.9 | | 9.3 | | 18.9 | | 6.2 | | | | |
| Green Ext Time (p_c), s | | 5.3 | | 1.0 | | 3.0 | | 1.2 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 8.9 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 7 | 12 | 7 | 0 |
| Future Vol, veh/h | 0 | 3 | 7 | 12 | 7 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 8 | 13 | 8 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 21 | 0 | - | 0 | 18 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1595 | - | - | - | 1000 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1595 | - | - | - | 1000 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 1000 | - |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1595 | - | - | - | 1000 |
| HCM Lane V/C Ratio | - | - | - | - | 0.008 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 16 | 27 | 29 | 17 | 0 |
| Future Vol, veh/h | 0 | 16 | 27 | 29 | 17 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 17 | 29 | 32 | 18 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 61 | 0 | - | 0 | 62 | 45 |
| Stage 1 | - | - | - | - | 45 | - |
| Stage 2 | - | - | - | - | 17 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1542 | - | - | - | 944 | 1025 |
| Stage 1 | - | - | - | - | 977 | - |
| Stage 2 | - | - | - | - | 1006 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1542 | - | - | - | 944 | 1025 |
| Mov Cap-2 Maneuver | - | - | - | - | 944 | - |
| Stage 1 | - | - | - | - | 977 | - |
| Stage 2 | - | - | - | - | 1006 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1542 | - | - | - | 944 |
| HCM Lane V/C Ratio | - | - | - | - | 0.02 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 27 | 7 | 7 | 48 | 11 |
| Future Vol, veh/h | 6 | 27 | 7 | 7 | 48 | 11 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 31 | 8 | 8 | 56 | 13 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 38 | 0 | 47 | 23 |
| Stage 1 | - | - | - | - | 23 | - |
| Stage 2 | - | - | - | - | 24 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1572 | - | 963 | 1054 |
| Stage 1 | - | - | - | - | 1000 | - |
| Stage 2 | - | - | - | - | 999 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1572 | - | 958 | 1054 |
| Mov Cap-2 Maneuver | - | - | - | - | 958 | - |
| Stage 1 | - | - | - | - | 995 | - |
| Stage 2 | - | - | - | - | 999 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.7 | 9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 975 | - | - | 1572 | - |
| HCM Lane V/C Ratio | 0.07 | - | - | 0.005 | - |
| HCM Control Delay (s) | 9 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 51 | 113 | 38 | 2 | 105 | 3 | 44 | 20 | 3 | 1 | 9 | 32 |
| Future Vol, veh/h | 51 | 113 | 38 | 2 | 105 | 3 | 44 | 20 | 3 | 1 | 9 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 59 | 131 | 44 | 2 | 122 | 3 | 51 | 23 | 3 | 1 | 10 | 37 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 126 | 0 | 0 | 178 | 0 | 0 | 425 | 404 | 156 | 413 | 425 | 125 |
| Stage 1 | - | - | - | - | - | - | 274 | 274 | - | 129 | 129 | - |
| Stage 2 | - | - | - | - | - | - | 151 | 130 | - | 284 | 296 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1460 | - | - | 1398 | - | - | 540 | 536 | 890 | 549 | 521 | 926 |
| Stage 1 | - | - | - | - | - | - | 732 | 683 | - | 875 | 789 | - |
| Stage 2 | - | - | - | - | - | - | 851 | 789 | - | 723 | 668 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1459 | - | - | 1394 | - | - | 490 | 509 | 887 | 508 | 494 | 925 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 490 | 509 | - | 508 | 494 | - |
| Stage 1 | - | - | - | - | - | - | 697 | 650 | - | 835 | 787 | - |
| Stage 2 | - | - | - | - | - | - | 804 | 787 | - | 663 | 636 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.9 | 0.1 | 13.4 | 10 |
| HCM LOS | | | B | B |

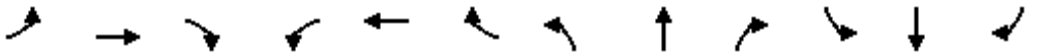
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 506 | 1459 | - | - | 1394 | - | - | 767 |
| HCM Lane V/C Ratio | 0.154 | 0.041 | - | - | 0.002 | - | - | 0.064 |
| HCM Control Delay (s) | 13.4 | 7.6 | 0 | - | 7.6 | 0 | - | 10 |
| HCM Lane LOS | B | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.5 | 0.1 | - | - | 0 | - | - | 0.2 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 98 | 1382 | 19 | 16 | 873 | 14 | 9 | 85 | 11 |
| Future Volume (vph) | 98 | 1382 | 19 | 16 | 873 | 14 | 9 | 85 | 11 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 61.6 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 98 | 1382 | 19 | 16 | 873 | 51 | 14 | 9 | 19 | 85 | 11 | 110 |
| Future Volume (veh/h) | 98 | 1382 | 19 | 16 | 873 | 51 | 14 | 9 | 19 | 85 | 11 | 110 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.98 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 104 | 1470 | 19 | 17 | 929 | 50 | 15 | 10 | 8 | 90 | 12 | 61 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 134 | 1840 | 796 | 37 | 1587 | 85 | 207 | 133 | 82 | 420 | 57 | 291 |
| Arrive On Green | 0.08 | 0.52 | 0.52 | 0.02 | 0.46 | 0.46 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1538 | 1781 | 3427 | 184 | 563 | 617 | 378 | 1375 | 265 | 1347 |
| Grp Volume(v), veh/h | 104 | 1470 | 19 | 17 | 482 | 497 | 33 | 0 | 0 | 90 | 0 | 73 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1538 | 1781 | 1777 | 1835 | 1558 | 0 | 0 | 1375 | 0 | 1612 |
| Q Serve(g_s), s | 3.5 | 20.8 | 0.4 | 0.6 | 12.2 | 12.2 | 0.0 | 0.0 | 0.0 | 2.2 | 0.0 | 2.3 |
| Cycle Q Clear(g_c), s | 3.5 | 20.8 | 0.4 | 0.6 | 12.2 | 12.2 | 0.9 | 0.0 | 0.0 | 3.1 | 0.0 | 2.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.10 | 0.45 | | 0.24 | 1.00 | | 0.84 |
| Lane Grp Cap(c), veh/h | 134 | 1840 | 796 | 37 | 823 | 850 | 422 | 0 | 0 | 420 | 0 | 348 |
| V/C Ratio(X) | 0.78 | 0.80 | 0.02 | 0.47 | 0.59 | 0.59 | 0.08 | 0.00 | 0.00 | 0.21 | 0.00 | 0.21 |
| Avail Cap(c_a), veh/h | 245 | 2214 | 958 | 146 | 1008 | 1040 | 888 | 0 | 0 | 845 | 0 | 846 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.7 | 12.1 | 7.2 | 29.5 | 12.1 | 12.1 | 19.1 | 0.0 | 0.0 | 19.9 | 0.0 | 19.6 |
| Incr Delay (d2), s/veh | 3.7 | 1.8 | 0.0 | 3.4 | 0.7 | 0.6 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 6.2 | 0.1 | 0.3 | 3.8 | 3.9 | 0.4 | 0.0 | 0.0 | 1.0 | 0.0 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 31.4 | 13.9 | 7.2 | 32.9 | 12.7 | 12.7 | 19.1 | 0.0 | 0.0 | 20.0 | 0.0 | 19.8 |
| LnGrp LOS | C | B | A | C | B | B | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1593 | | | 996 | | | 33 | | | 163 | |
| Approach Delay, s/veh | | 15.0 | | | 13.1 | | | 19.1 | | | 19.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.9 | 37.4 | | 17.8 | 9.2 | 34.1 | | 17.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.6 | 22.8 | | 5.1 | 5.5 | 14.2 | | 2.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 8.8 | | 0.4 | 0.0 | 5.8 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 14.6 | |
| HCM 6th LOS | | B | |

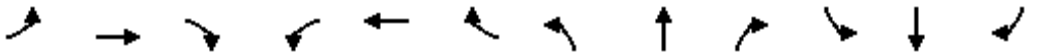
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 1176 | 222 | 101 | 745 | 195 | 162 | 220 | 156 | 139 | 22 |
| Future Volume (vph) | 25 | 1176 | 222 | 101 | 745 | 195 | 162 | 220 | 156 | 139 | 22 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 76.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 25 | 1176 | 222 | 101 | 745 | 92 | 195 | 162 | 220 | 156 | 139 | 22 |
| Future Volume (veh/h) | 25 | 1176 | 222 | 101 | 745 | 92 | 195 | 162 | 220 | 156 | 139 | 22 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 27 | 1251 | 195 | 107 | 793 | 78 | 207 | 172 | 160 | 166 | 148 | 10 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 51 | 1550 | 681 | 137 | 1579 | 155 | 407 | 539 | 457 | 321 | 1024 | 444 |
| Arrive On Green | 0.03 | 0.44 | 0.44 | 0.08 | 0.48 | 0.48 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3260 | 321 | 1214 | 1870 | 1585 | 1048 | 3554 | 1541 |
| Grp Volume(v), veh/h | 27 | 1251 | 195 | 107 | 432 | 439 | 207 | 172 | 160 | 166 | 148 | 10 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1804 | 1214 | 1870 | 1585 | 1048 | 1777 | 1541 |
| Q Serve(g_s), s | 1.1 | 23.4 | 6.1 | 4.5 | 12.7 | 12.7 | 11.7 | 5.5 | 6.1 | 11.3 | 2.4 | 0.4 |
| Cycle Q Clear(g_c), s | 1.1 | 23.4 | 6.1 | 4.5 | 12.7 | 12.7 | 14.0 | 5.5 | 6.1 | 16.8 | 2.4 | 0.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.18 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 51 | 1550 | 681 | 137 | 861 | 874 | 407 | 539 | 457 | 321 | 1024 | 444 |
| V/C Ratio(X) | 0.53 | 0.81 | 0.29 | 0.78 | 0.50 | 0.50 | 0.51 | 0.32 | 0.35 | 0.52 | 0.14 | 0.02 |
| Avail Cap(c_a), veh/h | 133 | 1884 | 828 | 219 | 1028 | 1044 | 611 | 854 | 724 | 499 | 1628 | 706 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.6 | 18.7 | 13.9 | 34.6 | 13.4 | 13.4 | 25.4 | 21.3 | 21.5 | 27.9 | 20.2 | 19.5 |
| Incr Delay (d2), s/veh | 3.2 | 2.2 | 0.2 | 3.7 | 0.5 | 0.4 | 0.4 | 0.1 | 0.2 | 0.5 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 8.6 | 1.9 | 2.0 | 4.3 | 4.4 | 3.1 | 2.2 | 2.1 | 2.8 | 0.9 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.8 | 21.0 | 14.1 | 38.3 | 13.9 | 13.9 | 25.8 | 21.4 | 21.7 | 28.4 | 20.2 | 19.5 |
| LnGrp LOS | D | C | B | D | B | B | C | C | C | C | C | B |
| Approach Vol, veh/h | | 1473 | | | 978 | | | 539 | | | 324 | |
| Approach Delay, s/veh | | 20.4 | | | 16.6 | | | 23.2 | | | 24.4 | |
| Approach LOS | | C | | | B | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.5 | 39.1 | | 26.8 | 6.8 | 42.8 | | 26.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.5 | 25.4 | | 18.8 | 3.1 | 14.7 | | 16.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 7.9 | | 1.0 | 0.0 | 5.5 | | 1.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 20.1 | |
| HCM 6th LOS | | C | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 6.3:

# OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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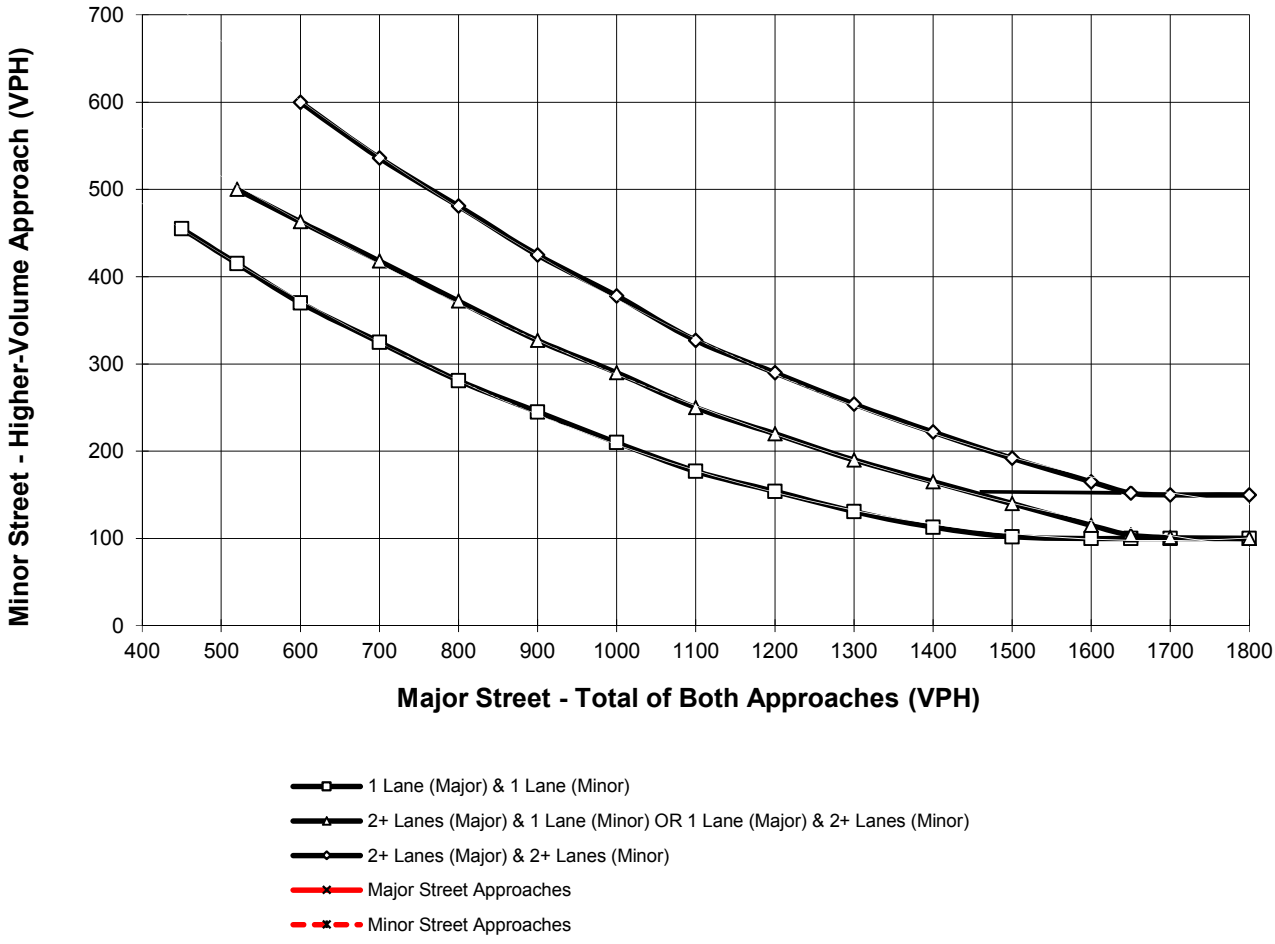
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **41**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **23**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

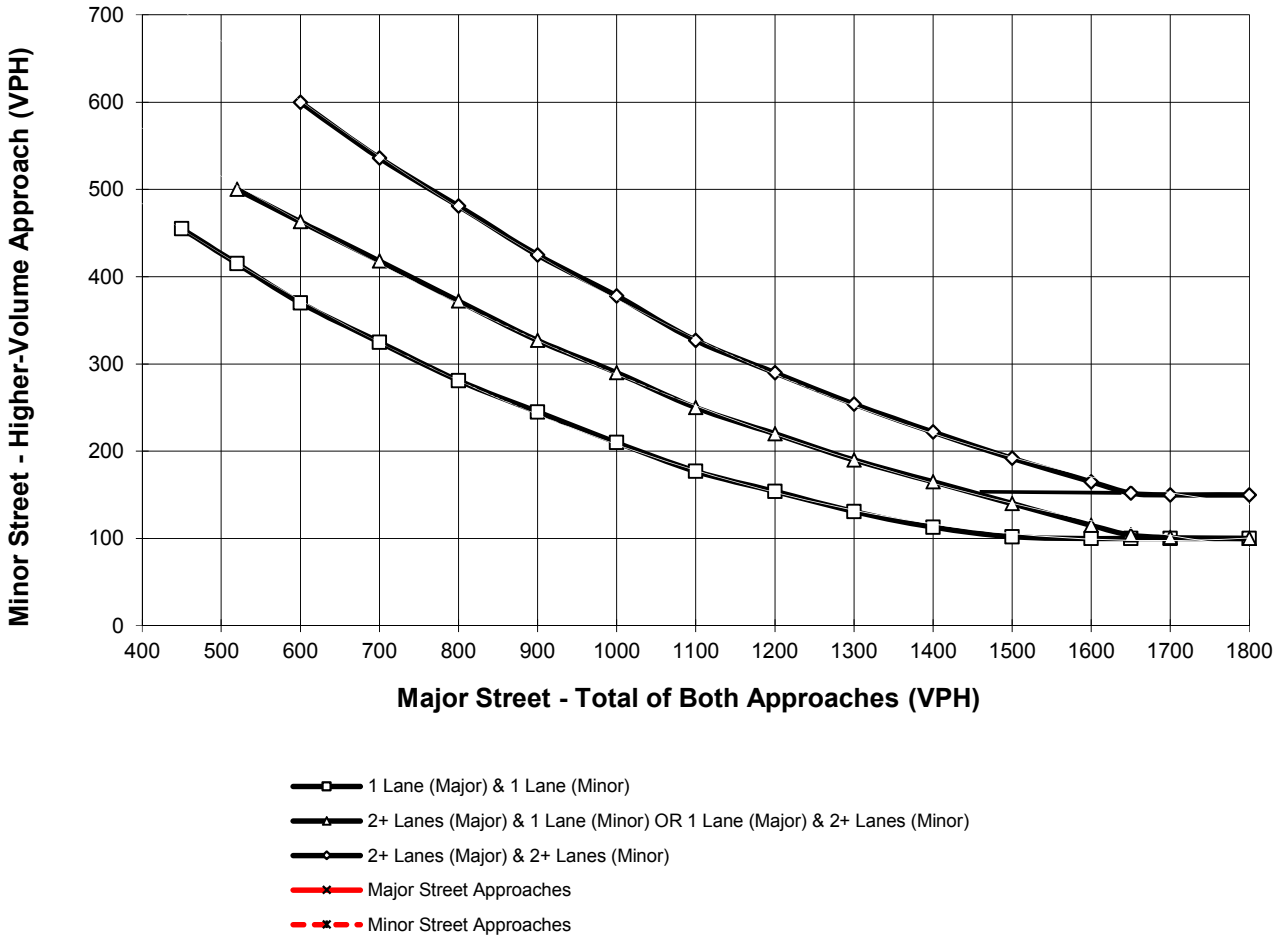
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **248**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **75**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 6.4:

# OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 With Project Conditions - Weekday AM Peak Hour**

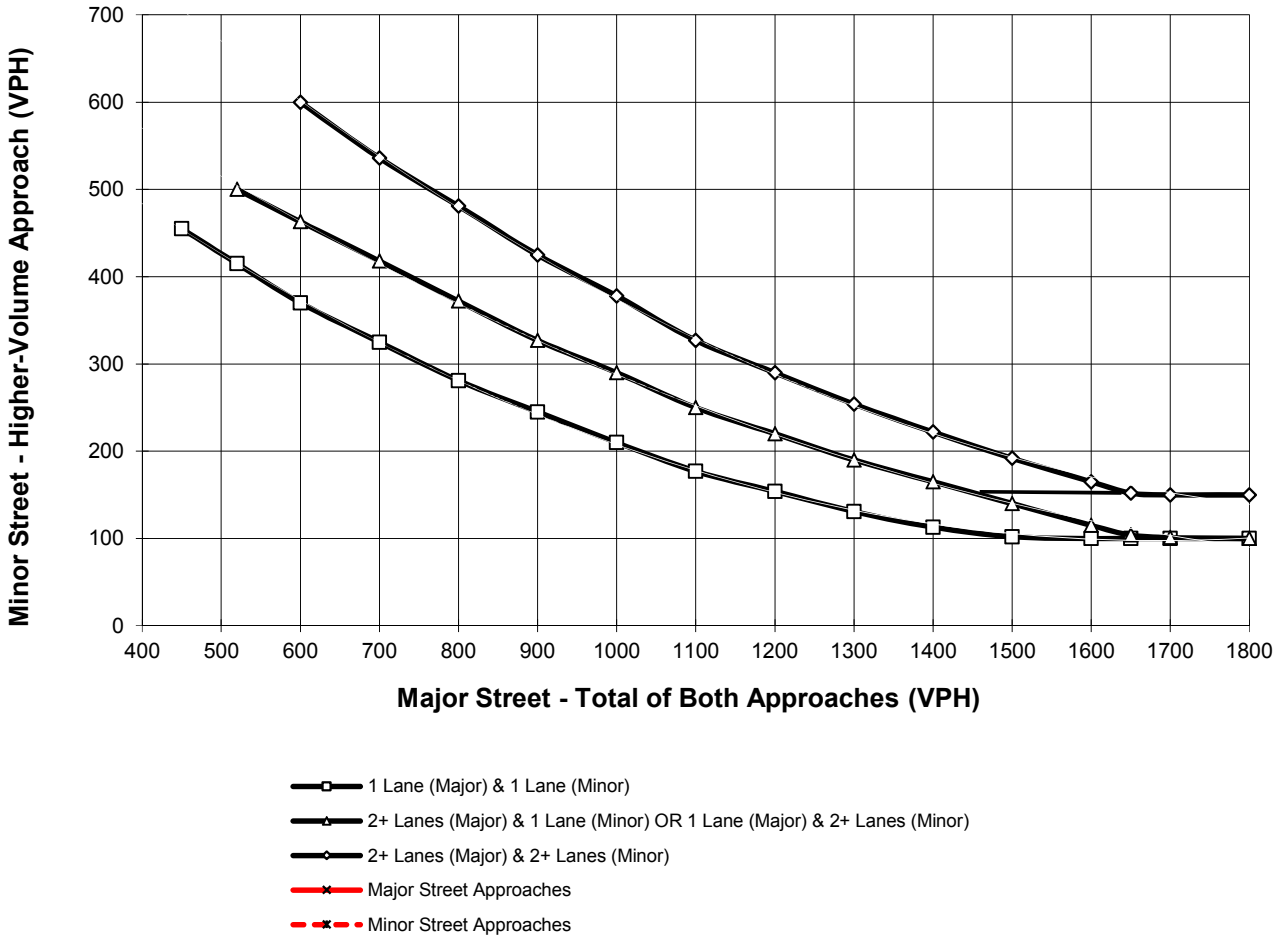
Major Street Name = **15th Street**

Total of Both Approaches (VPH) = **10**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 1**

High Volume Approach (VPH) = **11**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 With Project Conditions - Weekday AM Peak Hour**

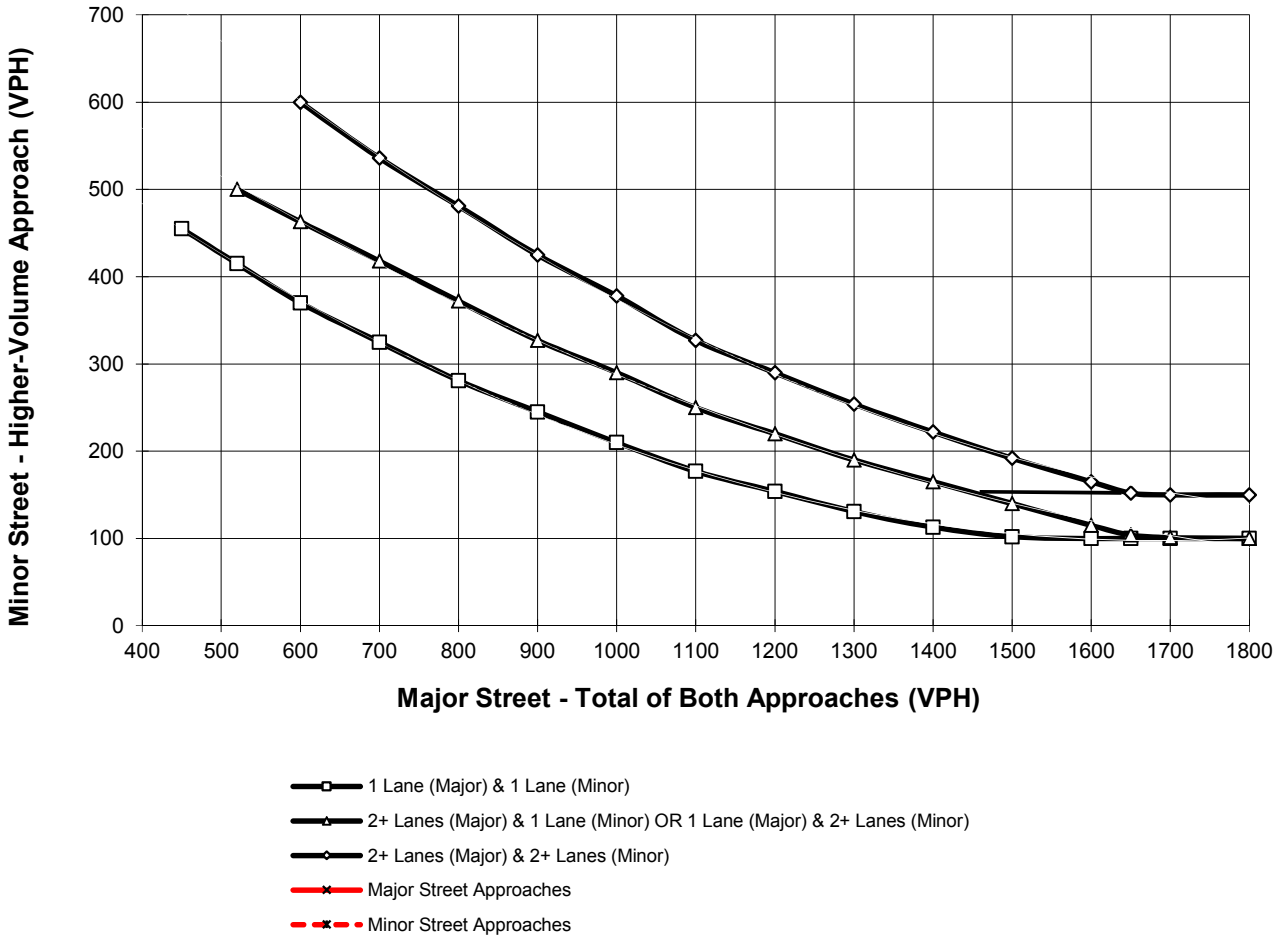
Major Street Name = **15th Street**

Total of Both Approaches (VPH) = **56**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**

High Volume Approach (VPH) = **26**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

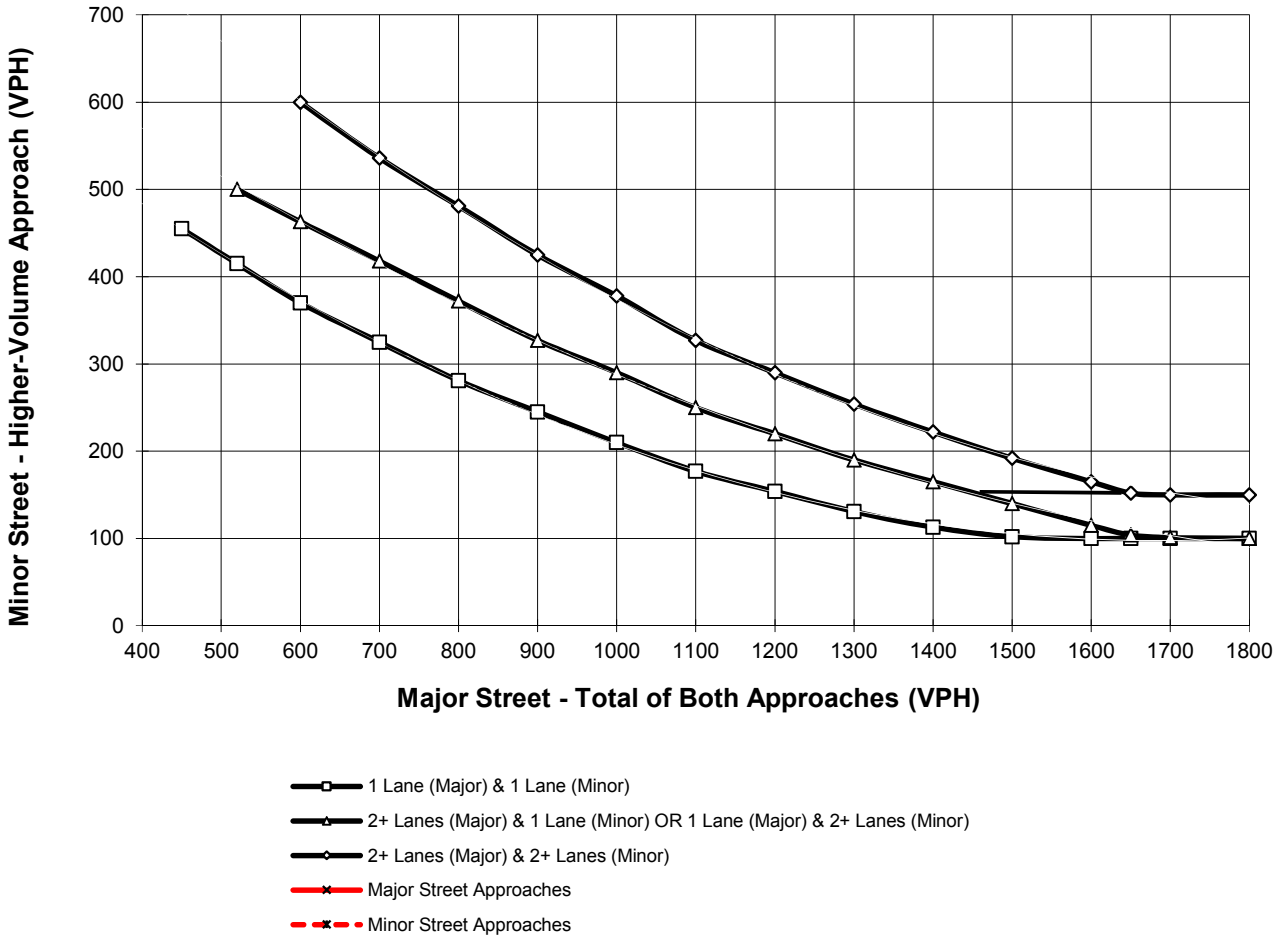
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 With Project Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **78**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **36**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

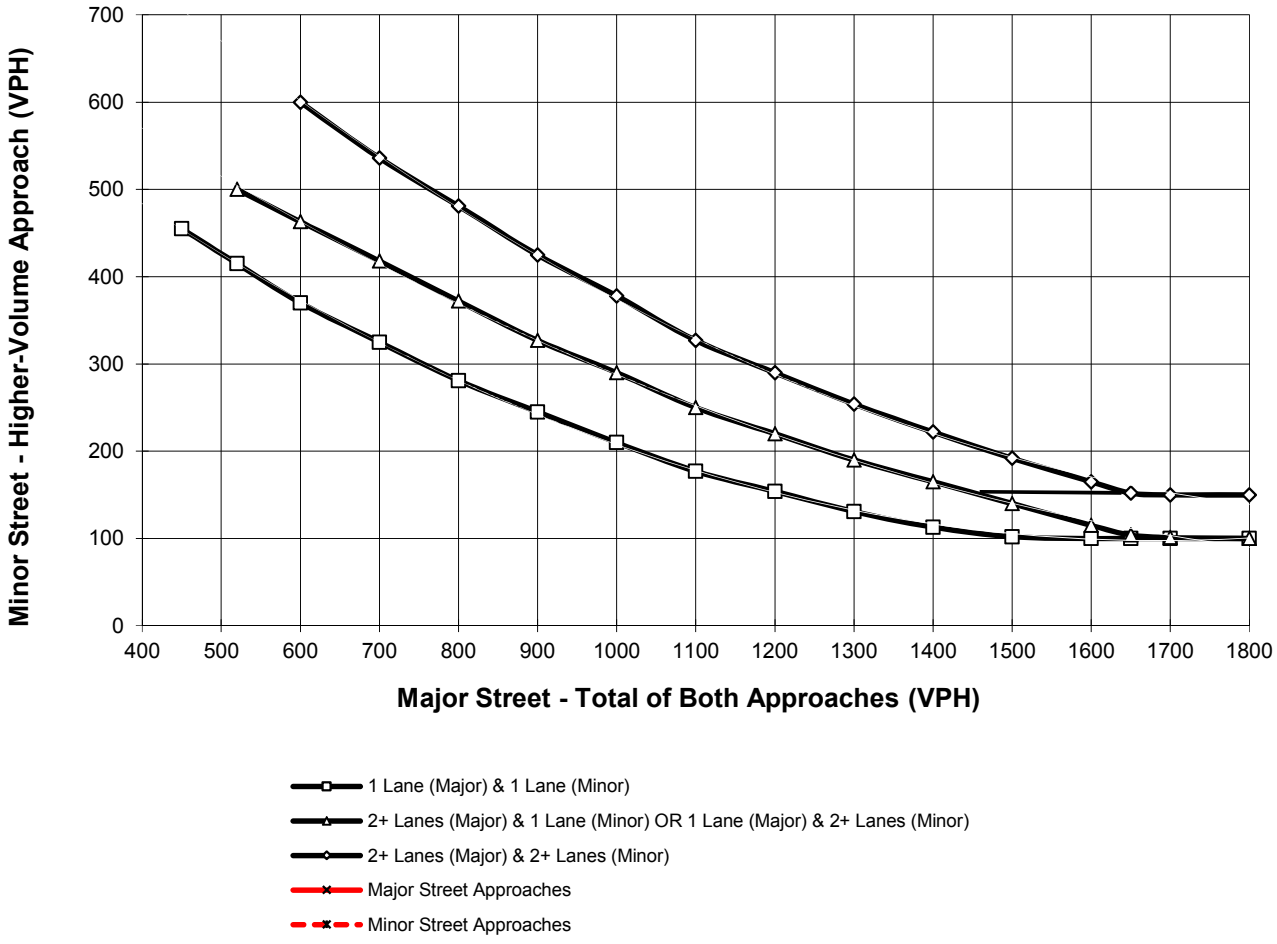
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2020 With Project Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **258**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **78**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 6.5:

# OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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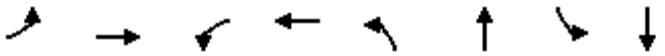
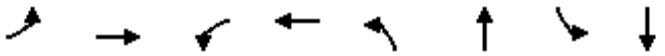


| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 87 | 126 | 46 | 311 | 38 | 525 | 132 | 825 |
| v/c Ratio | 0.27 | 0.21 | 0.11 | 0.49 | 0.17 | 0.37 | 0.38 | 0.58 |
| Control Delay | 13.3 | 8.2 | 11.0 | 10.3 | 10.9 | 9.2 | 13.1 | 10.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 13.3 | 8.2 | 11.0 | 10.3 | 10.9 | 9.2 | 13.1 | 10.9 |
| Queue Length 50th (ft) | 13 | 11 | 6 | 31 | 4 | 31 | 15 | 52 |
| Queue Length 95th (ft) | 44 | 42 | 25 | 93 | 24 | 88 | 66 | 144 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 662 | 1173 | 845 | 1183 | 361 | 2300 | 558 | 2277 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.11 | 0.05 | 0.26 | 0.11 | 0.23 | 0.24 | 0.36 |

Intersection Summary



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 103 | 156 | 37 | 201 | 28 | 906 | 147 | 658 |
| v/c Ratio | 0.30 | 0.29 | 0.10 | 0.37 | 0.06 | 0.42 | 0.45 | 0.31 |
| Control Delay | 16.5 | 14.0 | 13.5 | 10.7 | 8.0 | 8.3 | 16.9 | 7.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 16.5 | 14.0 | 13.5 | 10.7 | 8.0 | 8.3 | 16.9 | 7.3 |
| Queue Length 50th (ft) | 23 | 32 | 8 | 27 | 3 | 61 | 20 | 40 |
| Queue Length 95th (ft) | 53 | 65 | 24 | 65 | 19 | 174 | #120 | 117 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 672 | 1046 | 706 | 1011 | 463 | 2174 | 335 | 2165 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.15 | 0.15 | 0.05 | 0.20 | 0.06 | 0.42 | 0.44 | 0.30 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 6.6:

# OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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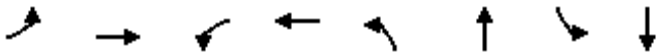
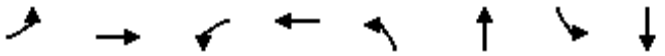


| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 87 | 128 | 54 | 336 | 38 | 528 | 138 | 825 |
| v/c Ratio | 0.27 | 0.20 | 0.12 | 0.50 | 0.17 | 0.34 | 0.37 | 0.54 |
| Control Delay | 13.0 | 7.7 | 10.6 | 10.0 | 10.2 | 8.4 | 12.1 | 9.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 13.0 | 7.7 | 10.6 | 10.0 | 10.2 | 8.4 | 12.1 | 9.8 |
| Queue Length 50th (ft) | 13 | 11 | 7 | 33 | 4 | 29 | 15 | 49 |
| Queue Length 95th (ft) | 44 | 42 | 28 | 99 | 23 | 85 | 66 | 138 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 616 | 1202 | 858 | 1201 | 357 | 2396 | 579 | 2370 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.14 | 0.11 | 0.06 | 0.28 | 0.11 | 0.22 | 0.24 | 0.35 |

Intersection Summary



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 103 | 162 | 43 | 216 | 28 | 915 | 164 | 658 |
| v/c Ratio | 0.35 | 0.34 | 0.13 | 0.43 | 0.07 | 0.49 | 0.60 | 0.35 |
| Control Delay | 17.9 | 14.8 | 14.1 | 12.0 | 8.1 | 9.0 | 23.8 | 7.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 17.9 | 14.8 | 14.1 | 12.0 | 8.1 | 9.0 | 23.8 | 7.8 |
| Queue Length 50th (ft) | 24 | 33 | 9 | 31 | 3 | 62 | 24 | 40 |
| Queue Length 95th (ft) | 54 | 68 | 26 | 71 | 19 | 175 | #142 | 117 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 569 | 920 | 615 | 895 | 403 | 1906 | 278 | 1902 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.18 | 0.18 | 0.07 | 0.24 | 0.07 | 0.48 | 0.59 | 0.35 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 7.1:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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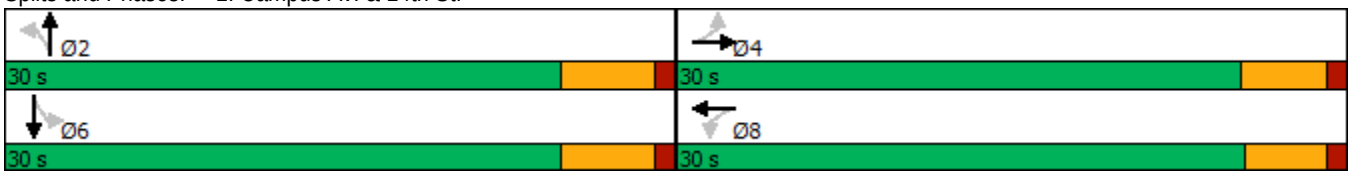
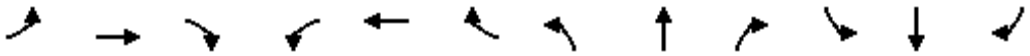
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 119 | 106 | 44 | 182 | 69 | 481 | 127 | 718 |
| Future Volume (vph) | 119 | 106 | 44 | 182 | 69 | 481 | 127 | 718 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 44.8 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 119 | 106 | 85 | 44 | 182 | 151 | 69 | 481 | 29 | 127 | 718 | 170 |
| Future Volume (veh/h) | 119 | 106 | 85 | 44 | 182 | 151 | 69 | 481 | 29 | 127 | 718 | 170 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 137 | 122 | 92 | 51 | 209 | 140 | 79 | 553 | 28 | 146 | 825 | 193 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 355 | 357 | 269 | 459 | 380 | 254 | 259 | 1500 | 76 | 417 | 1246 | 291 |
| Arrive On Green | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 |
| Sat Flow, veh/h | 1031 | 981 | 740 | 1153 | 1044 | 700 | 554 | 3442 | 174 | 833 | 2858 | 668 |
| Grp Volume(v), veh/h | 137 | 0 | 214 | 51 | 0 | 349 | 79 | 285 | 296 | 146 | 513 | 505 |
| Grp Sat Flow(s),veh/h/ln | 1031 | 0 | 1720 | 1153 | 0 | 1744 | 554 | 1777 | 1839 | 833 | 1777 | 1749 |
| Q Serve(g_s), s | 6.1 | 0.0 | 4.5 | 1.7 | 0.0 | 7.9 | 6.6 | 5.4 | 5.4 | 7.1 | 11.4 | 11.4 |
| Cycle Q Clear(g_c), s | 14.0 | 0.0 | 4.5 | 6.2 | 0.0 | 7.9 | 18.0 | 5.4 | 5.4 | 12.5 | 11.4 | 11.4 |
| Prop In Lane | 1.00 | | 0.43 | 1.00 | | 0.40 | 1.00 | | 0.09 | 1.00 | | 0.38 |
| Lane Grp Cap(c), veh/h | 355 | 0 | 626 | 459 | 0 | 634 | 259 | 774 | 802 | 417 | 774 | 762 |
| V/C Ratio(X) | 0.39 | 0.00 | 0.34 | 0.11 | 0.00 | 0.55 | 0.31 | 0.37 | 0.37 | 0.35 | 0.66 | 0.66 |
| Avail Cap(c_a), veh/h | 501 | 0 | 868 | 627 | 0 | 887 | 293 | 883 | 913 | 468 | 883 | 869 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.2 | 0.0 | 11.5 | 13.8 | 0.0 | 12.6 | 18.3 | 9.5 | 9.5 | 13.7 | 11.2 | 11.2 |
| Incr Delay (d2), s/veh | 0.7 | 0.0 | 0.3 | 0.1 | 0.0 | 0.7 | 0.7 | 0.3 | 0.3 | 0.5 | 1.5 | 1.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.3 | 0.0 | 1.5 | 0.4 | 0.0 | 2.8 | 0.7 | 1.6 | 1.6 | 1.1 | 3.6 | 3.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 18.9 | 0.0 | 11.9 | 13.9 | 0.0 | 13.4 | 19.0 | 9.8 | 9.8 | 14.2 | 12.7 | 12.7 |
| LnGrp LOS | B | A | B | B | A | B | B | A | A | B | B | B |
| Approach Vol, veh/h | | 351 | | | 400 | | | 660 | | | 1164 | |
| Approach Delay, s/veh | | 14.6 | | | 13.4 | | | 10.9 | | | 12.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 27.0 | | 23.0 | | 27.0 | | 23.0 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 20.0 | | 16.0 | | 14.5 | | 9.9 | | | | |
| Green Ext Time (p_c), s | | 1.7 | | 1.2 | | 5.1 | | 2.2 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 12.7 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 16 | 21 | 5 | 10 | 15 |
| Future Vol, veh/h | 3 | 16 | 21 | 5 | 10 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 23 | 30 | 7 | 14 | 22 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 27 | 0 | 83 | 17 |
| Stage 1 | - | - | - | - | 16 | - |
| Stage 2 | - | - | - | - | 67 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1587 | - | 919 | 1062 |
| Stage 1 | - | - | - | - | 1007 | - |
| Stage 2 | - | - | - | - | 956 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1587 | - | 902 | 1061 |
| Mov Cap-2 Maneuver | - | - | - | - | 902 | - |
| Stage 1 | - | - | - | - | 988 | - |
| Stage 2 | - | - | - | - | 956 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 5.9 | 8.8 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 991 | - | - | 1587 | - |
| HCM Lane V/C Ratio | 0.037 | - | - | 0.019 | - |
| HCM Control Delay (s) | 8.8 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 17 | 122 | 74 | 8 | 114 | 2 | 65 | 14 | 5 | 4 | 13 | 32 |
| Future Vol, veh/h | 17 | 122 | 74 | 8 | 114 | 2 | 65 | 14 | 5 | 4 | 13 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 22 | 156 | 95 | 10 | 146 | 3 | 83 | 18 | 6 | 5 | 17 | 41 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 151 | 0 | 0 | 272 | 0 | 0 | 467 | 440 | 229 | 434 | 486 | 151 |
| Stage 1 | - | - | - | - | - | - | 269 | 269 | - | 170 | 170 | - |
| Stage 2 | - | - | - | - | - | - | 198 | 171 | - | 264 | 316 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1430 | - | - | 1291 | - | - | 506 | 511 | 810 | 532 | 481 | 895 |
| Stage 1 | - | - | - | - | - | - | 737 | 687 | - | 832 | 758 | - |
| Stage 2 | - | - | - | - | - | - | 804 | 757 | - | 741 | 655 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1427 | - | - | 1265 | - | - | 450 | 486 | 791 | 500 | 458 | 892 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 450 | 486 | - | 500 | 458 | - |
| Stage 1 | - | - | - | - | - | - | 709 | 661 | - | 815 | 750 | - |
| Stage 2 | - | - | - | - | - | - | 743 | 749 | - | 699 | 630 | - |

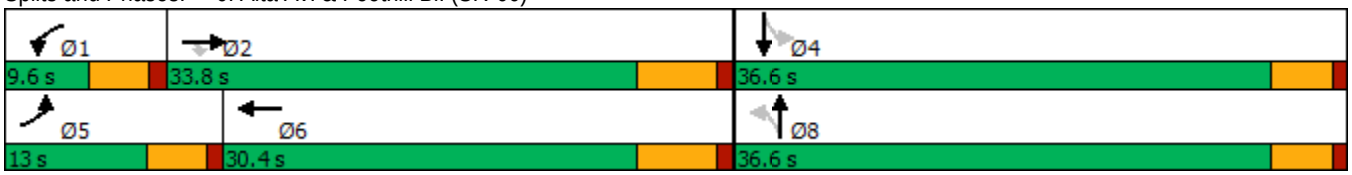
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0.5 | 15 | 10.9 |
| HCM LOS | | | C | B |

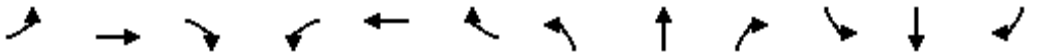
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 468 | 1427 | - | - | 1265 | - | - | 678 |
| HCM Lane V/C Ratio | 0.23 | 0.015 | - | - | 0.008 | - | - | 0.093 |
| HCM Control Delay (s) | 15 | 7.6 | 0 | - | 7.9 | 0 | - | 10.9 |
| HCM Lane LOS | C | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.9 | 0 | - | - | 0 | - | - | 0.3 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 225 | 621 | 23 | 15 | 837 | 13 | 8 | 166 | 14 |
| Future Volume (vph) | 225 | 621 | 23 | 15 | 837 | 13 | 8 | 166 | 14 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 63.9 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 225 | 621 | 23 | 15 | 837 | 173 | 13 | 8 | 6 | 166 | 14 | 190 |
| Future Volume (veh/h) | 225 | 621 | 23 | 15 | 837 | 173 | 13 | 8 | 6 | 166 | 14 | 190 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 253 | 698 | 23 | 17 | 940 | 185 | 15 | 9 | 5 | 187 | 16 | 192 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 261 | 1803 | 781 | 37 | 1128 | 222 | 160 | 87 | 32 | 404 | 25 | 306 |
| Arrive On Green | 0.15 | 0.51 | 0.51 | 0.02 | 0.38 | 0.38 | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1781 | 3554 | 1539 | 1781 | 2956 | 581 | 309 | 415 | 151 | 1394 | 121 | 1457 |
| Grp Volume(v), veh/h | 253 | 698 | 23 | 17 | 565 | 560 | 29 | 0 | 0 | 187 | 0 | 208 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1539 | 1781 | 1777 | 1760 | 876 | 0 | 0 | 1394 | 0 | 1578 |
| Q Serve(g_s), s | 8.1 | 6.9 | 0.4 | 0.5 | 16.5 | 16.5 | 0.1 | 0.0 | 0.0 | 0.7 | 0.0 | 6.9 |
| Cycle Q Clear(g_c), s | 8.1 | 6.9 | 0.4 | 0.5 | 16.5 | 16.5 | 7.0 | 0.0 | 0.0 | 7.7 | 0.0 | 6.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.33 | 0.52 | | 0.17 | 1.00 | | 0.92 |
| Lane Grp Cap(c), veh/h | 261 | 1803 | 781 | 37 | 678 | 671 | 279 | 0 | 0 | 404 | 0 | 331 |
| V/C Ratio(X) | 0.97 | 0.39 | 0.03 | 0.46 | 0.83 | 0.83 | 0.10 | 0.00 | 0.00 | 0.46 | 0.00 | 0.63 |
| Avail Cap(c_a), veh/h | 261 | 1803 | 781 | 155 | 763 | 756 | 766 | 0 | 0 | 890 | 0 | 882 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 24.3 | 8.6 | 7.1 | 27.7 | 16.1 | 16.1 | 18.4 | 0.0 | 0.0 | 20.9 | 0.0 | 20.6 |
| Incr Delay (d2), s/veh | 46.6 | 0.1 | 0.0 | 3.3 | 7.2 | 7.3 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.3 | 1.9 | 0.1 | 0.2 | 6.6 | 6.5 | 0.3 | 0.0 | 0.0 | 2.2 | 0.0 | 2.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 70.9 | 8.8 | 7.1 | 31.0 | 23.2 | 23.4 | 18.4 | 0.0 | 0.0 | 21.3 | 0.0 | 21.3 |
| LnGrp LOS | E | A | A | C | C | C | B | A | A | C | A | C |
| Approach Vol, veh/h | | 974 | | | 1142 | | | 29 | | | 395 | |
| Approach Delay, s/veh | | 24.9 | | | 23.4 | | | 18.4 | | | 21.3 | |
| Approach LOS | | C | | | C | | | B | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.8 | 34.9 | | 16.6 | 13.0 | 27.7 | | 16.6 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 8.9 | | 9.7 | 10.1 | 18.5 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 1.2 | 0.0 | 3.3 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 23.6 | |
| HCM 6th LOS | | C | |

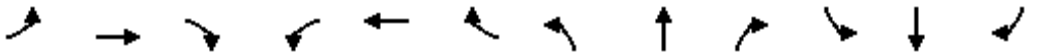
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 20 | 578 | 159 | 149 | 797 | 189 | 79 | 172 | 116 | 92 | 21 |
| Future Volume (vph) | 20 | 578 | 159 | 149 | 797 | 189 | 79 | 172 | 116 | 92 | 21 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 63.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 20 | 578 | 159 | 149 | 797 | 71 | 189 | 79 | 172 | 116 | 92 | 21 |
| Future Volume (veh/h) | 20 | 578 | 159 | 149 | 797 | 71 | 189 | 79 | 172 | 116 | 92 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 22 | 635 | 151 | 164 | 876 | 69 | 208 | 87 | 159 | 127 | 101 | 11 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 47 | 1040 | 461 | 211 | 1283 | 101 | 483 | 557 | 466 | 436 | 1058 | 456 |
| Arrive On Green | 0.03 | 0.29 | 0.29 | 0.12 | 0.39 | 0.39 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| Sat Flow, veh/h | 1781 | 3554 | 1574 | 1781 | 3330 | 262 | 1246 | 1870 | 1563 | 1133 | 3554 | 1532 |
| Grp Volume(v), veh/h | 22 | 635 | 151 | 164 | 467 | 478 | 208 | 87 | 159 | 127 | 101 | 11 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1574 | 1781 | 1777 | 1816 | 1246 | 1870 | 1563 | 1133 | 1777 | 1532 |
| Q Serve(g_s), s | 0.6 | 8.0 | 3.9 | 4.7 | 11.5 | 11.5 | 7.6 | 1.8 | 4.2 | 4.9 | 1.1 | 0.3 |
| Cycle Q Clear(g_c), s | 0.6 | 8.0 | 3.9 | 4.7 | 11.5 | 11.5 | 8.6 | 1.8 | 4.2 | 6.6 | 1.1 | 0.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.14 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 47 | 1040 | 461 | 211 | 684 | 699 | 483 | 557 | 466 | 436 | 1058 | 456 |
| V/C Ratio(X) | 0.47 | 0.61 | 0.33 | 0.78 | 0.68 | 0.68 | 0.43 | 0.16 | 0.34 | 0.29 | 0.10 | 0.02 |
| Avail Cap(c_a), veh/h | 252 | 1850 | 819 | 695 | 1367 | 1397 | 999 | 1331 | 1113 | 908 | 2537 | 1094 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 15.9 | 14.5 | 22.4 | 13.4 | 13.4 | 16.4 | 13.5 | 14.3 | 16.0 | 13.3 | 13.0 |
| Incr Delay (d2), s/veh | 2.7 | 0.6 | 0.4 | 2.3 | 1.2 | 1.2 | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 2.7 | 1.2 | 1.8 | 3.6 | 3.7 | 1.8 | 0.6 | 1.2 | 1.1 | 0.4 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.8 | 16.5 | 14.9 | 24.7 | 14.6 | 14.6 | 16.6 | 13.6 | 14.5 | 16.1 | 13.3 | 13.0 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 808 | | | 1109 | | | 454 | | | 239 | |
| Approach Delay, s/veh | | 16.5 | | | 16.1 | | | 15.3 | | | 14.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 21.1 | | 20.4 | 6.0 | 25.9 | | 20.4 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.7 | 10.0 | | 8.6 | 2.6 | 13.5 | | 10.6 | | | | |
| Green Ext Time (p_c), s | 0.2 | 4.1 | | 0.7 | 0.0 | 6.0 | | 0.9 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 16.0 | |
| HCM 6th LOS | | B | |

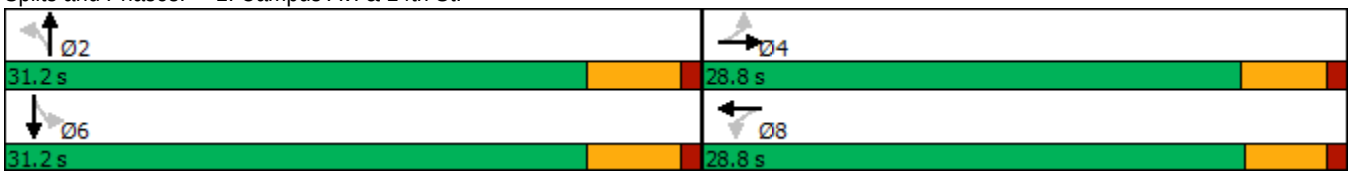
Notes

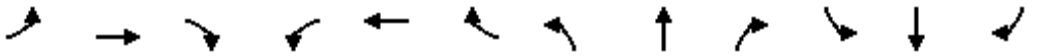
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 208 | 221 | 39 | 185 | 62 | 893 | 152 | 612 |
| Future Volume (vph) | 208 | 221 | 39 | 185 | 62 | 893 | 152 | 612 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 54.5 |
| Natural Cycle: 70 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 208 | 221 | 42 | 39 | 185 | 129 | 62 | 893 | 58 | 152 | 612 | 143 |
| Future Volume (veh/h) | 208 | 221 | 42 | 39 | 185 | 129 | 62 | 893 | 58 | 152 | 612 | 143 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 221 | 235 | 39 | 41 | 197 | 107 | 66 | 950 | 53 | 162 | 651 | 148 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 388 | 586 | 97 | 417 | 428 | 232 | 322 | 1541 | 86 | 260 | 1297 | 295 |
| Arrive On Green | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| Sat Flow, veh/h | 1075 | 1560 | 259 | 1103 | 1140 | 619 | 680 | 3417 | 191 | 562 | 2876 | 653 |
| Grp Volume(v), veh/h | 221 | 0 | 274 | 41 | 0 | 304 | 66 | 494 | 509 | 162 | 402 | 397 |
| Grp Sat Flow(s),veh/h/ln | 1075 | 0 | 1819 | 1103 | 0 | 1759 | 680 | 1777 | 1831 | 562 | 1777 | 1752 |
| Q Serve(g_s), s | 11.3 | 0.0 | 6.4 | 1.6 | 0.0 | 7.5 | 4.4 | 12.2 | 12.2 | 13.8 | 9.3 | 9.3 |
| Cycle Q Clear(g_c), s | 18.8 | 0.0 | 6.4 | 8.0 | 0.0 | 7.5 | 13.7 | 12.2 | 12.2 | 26.0 | 9.3 | 9.3 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.35 | 1.00 | | 0.10 | 1.00 | | 0.37 |
| Lane Grp Cap(c), veh/h | 388 | 0 | 683 | 417 | 0 | 660 | 322 | 801 | 826 | 260 | 801 | 790 |
| V/C Ratio(X) | 0.57 | 0.00 | 0.40 | 0.10 | 0.00 | 0.46 | 0.20 | 0.62 | 0.62 | 0.62 | 0.50 | 0.50 |
| Avail Cap(c_a), veh/h | 432 | 0 | 757 | 466 | 0 | 738 | 322 | 801 | 826 | 260 | 801 | 790 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.7 | 0.0 | 13.2 | 16.2 | 0.0 | 13.6 | 16.1 | 12.0 | 12.0 | 23.1 | 11.2 | 11.2 |
| Incr Delay (d2), s/veh | 1.4 | 0.0 | 0.4 | 0.1 | 0.0 | 0.5 | 0.3 | 1.4 | 1.4 | 4.6 | 0.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 0.0 | 2.3 | 0.4 | 0.0 | 2.8 | 0.6 | 4.0 | 4.1 | 2.3 | 2.9 | 2.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.1 | 0.0 | 13.6 | 16.3 | 0.0 | 14.1 | 16.4 | 13.5 | 13.4 | 27.7 | 11.7 | 11.7 |
| LnGrp LOS | C | A | B | B | A | B | B | B | B | C | B | B |
| Approach Vol, veh/h | | 495 | | | 345 | | | 1069 | | | 961 | |
| Approach Delay, s/veh | | 17.4 | | | 14.4 | | | 13.6 | | | 14.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 31.2 | | 26.4 | | 31.2 | | 26.4 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 15.7 | | 20.8 | | 28.0 | | 10.0 | | | | |
| Green Ext Time (p_c), s | | 4.7 | | 0.8 | | 0.0 | | 1.8 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 14.6 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 7 | 3 | 8 | 8 | 8 | 13 |
| Future Vol, veh/h | 7 | 3 | 8 | 8 | 8 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 8 | 3 | 9 | 9 | 9 | 15 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 37 | 10 |
| Stage 1 | - | - | - | - | 10 | - |
| Stage 2 | - | - | - | - | 27 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 975 | 1071 |
| Stage 1 | - | - | - | - | 1013 | - |
| Stage 2 | - | - | - | - | 996 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 969 | 1071 |
| Mov Cap-2 Maneuver | - | - | - | - | 969 | - |
| Stage 1 | - | - | - | - | 1007 | - |
| Stage 2 | - | - | - | - | 996 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.6 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1030 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.024 | - | - | 0.006 | - |
| HCM Control Delay (s) | 8.6 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.5 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 22 | 202 | 42 | 3 | 244 | 4 | 50 | 11 | 4 | 1 | 3 | 17 |
| Future Vol, veh/h | 22 | 202 | 42 | 3 | 244 | 4 | 50 | 11 | 4 | 1 | 3 | 17 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 26 | 235 | 49 | 3 | 284 | 5 | 58 | 13 | 5 | 1 | 3 | 20 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 290 | 0 | 0 | 287 | 0 | 0 | 619 | 611 | 263 | 615 | 633 | 288 |
| Stage 1 | - | - | - | - | - | - | 315 | 315 | - | 294 | 294 | - |
| Stage 2 | - | - | - | - | - | - | 304 | 296 | - | 321 | 339 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1272 | - | - | 1275 | - | - | 401 | 409 | 776 | 403 | 397 | 751 |
| Stage 1 | - | - | - | - | - | - | 696 | 656 | - | 714 | 670 | - |
| Stage 2 | - | - | - | - | - | - | 705 | 668 | - | 691 | 640 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1271 | - | - | 1271 | - | - | 379 | 396 | 774 | 382 | 385 | 750 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 379 | 396 | - | 382 | 385 | - |
| Stage 1 | - | - | - | - | - | - | 677 | 638 | - | 696 | 667 | - |
| Stage 2 | - | - | - | - | - | - | 681 | 665 | - | 657 | 623 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.7 | 0.1 | 16.3 | 10.9 |
| HCM LOS | | | C | B |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 394 | 1271 | - | - | 1271 | - | - | 635 |
| HCM Lane V/C Ratio | 0.192 | 0.02 | - | - | 0.003 | - | - | 0.038 |
| HCM Control Delay (s) | 16.3 | 7.9 | 0 | - | 7.8 | 0 | - | 10.9 |
| HCM Lane LOS | C | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 0.7 | 0.1 | - | - | 0 | - | - | 0.1 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 226 | 1510 | 21 | 17 | 959 | 15 | 19 | 189 | 17 |
| Future Volume (vph) | 226 | 1510 | 21 | 17 | 959 | 15 | 19 | 189 | 17 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 71.1 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 226 | 1510 | 21 | 17 | 959 | 135 | 15 | 19 | 21 | 189 | 17 | 195 |
| Future Volume (veh/h) | 226 | 1510 | 21 | 17 | 959 | 135 | 15 | 19 | 21 | 189 | 17 | 195 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.99 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 240 | 1606 | 21 | 18 | 1020 | 140 | 16 | 20 | 10 | 201 | 18 | 151 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 222 | 1860 | 805 | 38 | 1315 | 180 | 147 | 169 | 68 | 413 | 40 | 332 |
| Arrive On Green | 0.12 | 0.52 | 0.52 | 0.02 | 0.42 | 0.42 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| Sat Flow, veh/h | 1781 | 3554 | 1538 | 1781 | 3133 | 430 | 322 | 727 | 291 | 1365 | 170 | 1428 |
| Grp Volume(v), veh/h | 240 | 1606 | 21 | 18 | 578 | 582 | 46 | 0 | 0 | 201 | 0 | 169 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1538 | 1781 | 1777 | 1786 | 1339 | 0 | 0 | 1365 | 0 | 1598 |
| Q Serve(g_s), s | 8.4 | 26.5 | 0.4 | 0.7 | 18.8 | 18.9 | 0.1 | 0.0 | 0.0 | 3.4 | 0.0 | 6.1 |
| Cycle Q Clear(g_c), s | 8.4 | 26.5 | 0.4 | 0.7 | 18.8 | 18.9 | 6.2 | 0.0 | 0.0 | 9.6 | 0.0 | 6.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.24 | 0.35 | | 0.22 | 1.00 | | 0.89 |
| Lane Grp Cap(c), veh/h | 222 | 1860 | 805 | 38 | 746 | 750 | 384 | 0 | 0 | 413 | 0 | 372 |
| V/C Ratio(X) | 1.08 | 0.86 | 0.03 | 0.48 | 0.77 | 0.78 | 0.12 | 0.00 | 0.00 | 0.49 | 0.00 | 0.45 |
| Avail Cap(c_a), veh/h | 222 | 2007 | 868 | 132 | 913 | 918 | 752 | 0 | 0 | 744 | 0 | 760 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 29.5 | 13.9 | 7.8 | 32.6 | 16.8 | 16.8 | 20.4 | 0.0 | 0.0 | 23.6 | 0.0 | 22.2 |
| Incr Delay (d2), s/veh | 83.1 | 4.0 | 0.0 | 3.4 | 3.4 | 3.4 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 8.4 | 8.9 | 0.1 | 0.3 | 6.9 | 7.0 | 0.6 | 0.0 | 0.0 | 2.8 | 0.0 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 112.5 | 17.9 | 7.8 | 36.0 | 20.2 | 20.2 | 20.4 | 0.0 | 0.0 | 23.9 | 0.0 | 22.5 |
| LnGrp LOS | F | B | A | D | C | C | C | A | A | C | A | C |
| Approach Vol, veh/h | | 1867 | | | 1178 | | | 46 | | | 370 | |
| Approach Delay, s/veh | | 30.0 | | | 20.5 | | | 20.4 | | | 23.3 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.0 | 41.0 | | 20.3 | 13.0 | 34.1 | | 20.3 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 28.5 | | 11.6 | 10.4 | 20.9 | | 8.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.8 | | 1.0 | 0.0 | 6.0 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 25.9 | |
| HCM 6th LOS | | C | |

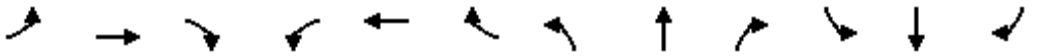
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 50 | 1278 | 242 | 110 | 820 | 211 | 208 | 240 | 207 | 153 | 37 |
| Future Volume (vph) | 50 | 1278 | 242 | 110 | 820 | 211 | 208 | 240 | 207 | 153 | 37 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 85.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 50 | 1278 | 242 | 110 | 820 | 162 | 211 | 208 | 240 | 207 | 153 | 37 |
| Future Volume (veh/h) | 50 | 1278 | 242 | 110 | 820 | 162 | 211 | 208 | 240 | 207 | 153 | 37 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 53 | 1360 | 216 | 117 | 872 | 152 | 224 | 221 | 181 | 220 | 163 | 26 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 71 | 1484 | 652 | 146 | 1385 | 241 | 440 | 635 | 538 | 323 | 1206 | 524 |
| Arrive On Green | 0.04 | 0.42 | 0.42 | 0.08 | 0.46 | 0.46 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3013 | 525 | 1183 | 1870 | 1585 | 983 | 3554 | 1544 |
| Grp Volume(v), veh/h | 53 | 1360 | 216 | 117 | 514 | 510 | 224 | 221 | 181 | 220 | 163 | 26 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1761 | 1183 | 1870 | 1585 | 983 | 1777 | 1544 |
| Q Serve(g_s), s | 2.8 | 34.0 | 8.8 | 6.1 | 20.7 | 20.7 | 15.2 | 8.3 | 8.0 | 20.4 | 3.0 | 1.1 |
| Cycle Q Clear(g_c), s | 2.8 | 34.0 | 8.8 | 6.1 | 20.7 | 20.7 | 18.2 | 8.3 | 8.0 | 28.7 | 3.0 | 1.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.30 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 71 | 1484 | 652 | 146 | 817 | 809 | 440 | 635 | 538 | 323 | 1206 | 524 |
| V/C Ratio(X) | 0.75 | 0.92 | 0.33 | 0.80 | 0.63 | 0.63 | 0.51 | 0.35 | 0.34 | 0.68 | 0.14 | 0.05 |
| Avail Cap(c_a), veh/h | 108 | 1527 | 671 | 178 | 833 | 826 | 477 | 693 | 587 | 354 | 1320 | 573 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.8 | 25.9 | 18.6 | 42.5 | 19.4 | 19.4 | 27.9 | 23.3 | 23.2 | 34.1 | 21.6 | 20.9 |
| Incr Delay (d2), s/veh | 5.7 | 8.9 | 0.3 | 15.8 | 1.5 | 1.5 | 0.3 | 0.1 | 0.1 | 3.5 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.3 | 14.7 | 3.0 | 3.2 | 8.0 | 7.9 | 4.1 | 3.5 | 2.9 | 5.1 | 1.2 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 50.5 | 34.8 | 18.9 | 58.3 | 20.9 | 20.9 | 28.2 | 23.4 | 23.4 | 37.6 | 21.6 | 20.9 |
| LnGrp LOS | D | C | B | E | C | C | C | C | C | D | C | C |
| Approach Vol, veh/h | | 1629 | | | 1141 | | | 626 | | | 409 | |
| Approach Delay, s/veh | | 33.2 | | | 24.7 | | | 25.1 | | | 30.2 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.3 | 45.1 | | 36.8 | 8.4 | 49.1 | | 36.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 8.1 | 36.0 | | 30.7 | 4.8 | 22.7 | | 20.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.3 | | 0.6 | 0.0 | 6.3 | | 1.3 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 29.0 | |
| HCM 6th LOS | | C | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 7.2:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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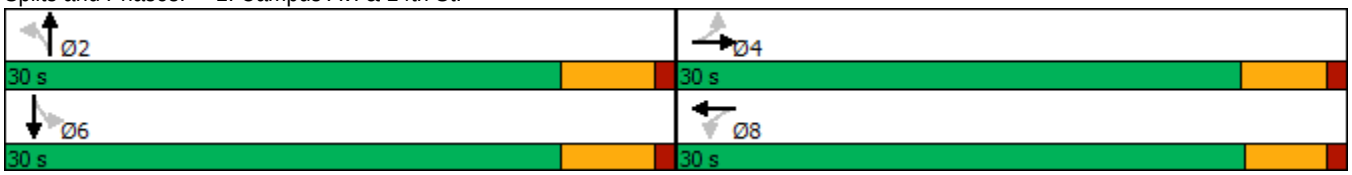
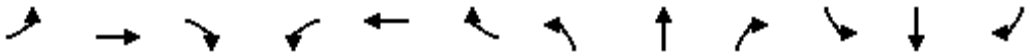
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 119 | 108 | 51 | 188 | 69 | 481 | 132 | 718 |
| Future Volume (vph) | 119 | 108 | 51 | 188 | 69 | 481 | 132 | 718 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| Total Split (%) | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% | 50.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 45.9 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 119 | 108 | 85 | 51 | 188 | 166 | 69 | 481 | 32 | 132 | 718 | 170 |
| Future Volume (veh/h) | 119 | 108 | 85 | 51 | 188 | 166 | 69 | 481 | 32 | 132 | 718 | 170 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 137 | 124 | 92 | 59 | 216 | 157 | 79 | 553 | 32 | 152 | 825 | 193 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 343 | 368 | 273 | 466 | 375 | 273 | 252 | 1477 | 85 | 408 | 1236 | 289 |
| Arrive On Green | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 |
| Sat Flow, veh/h | 1009 | 989 | 733 | 1151 | 1006 | 732 | 554 | 3414 | 197 | 830 | 2858 | 668 |
| Grp Volume(v), veh/h | 137 | 0 | 216 | 59 | 0 | 373 | 79 | 287 | 298 | 152 | 513 | 505 |
| Grp Sat Flow(s),veh/h/ln | 1009 | 0 | 1722 | 1151 | 0 | 1738 | 554 | 1777 | 1835 | 830 | 1777 | 1749 |
| Q Serve(g_s), s | 6.4 | 0.0 | 4.6 | 2.0 | 0.0 | 8.8 | 6.8 | 5.6 | 5.6 | 7.8 | 11.8 | 11.8 |
| Cycle Q Clear(g_c), s | 15.2 | 0.0 | 4.6 | 6.6 | 0.0 | 8.8 | 18.6 | 5.6 | 5.6 | 13.4 | 11.8 | 11.8 |
| Prop In Lane | 1.00 | | 0.43 | 1.00 | | 0.42 | 1.00 | | 0.11 | 1.00 | | 0.38 |
| Lane Grp Cap(c), veh/h | 343 | 0 | 642 | 466 | 0 | 648 | 252 | 769 | 794 | 408 | 769 | 757 |
| V/C Ratio(X) | 0.40 | 0.00 | 0.34 | 0.13 | 0.00 | 0.58 | 0.31 | 0.37 | 0.38 | 0.37 | 0.67 | 0.67 |
| Avail Cap(c_a), veh/h | 463 | 0 | 845 | 606 | 0 | 860 | 280 | 858 | 886 | 450 | 858 | 845 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.0 | 0.0 | 11.6 | 13.9 | 0.0 | 12.9 | 19.1 | 9.9 | 9.9 | 14.4 | 11.6 | 11.6 |
| Incr Delay (d2), s/veh | 0.8 | 0.0 | 0.3 | 0.1 | 0.0 | 0.8 | 0.7 | 0.3 | 0.3 | 0.6 | 1.7 | 1.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 0.0 | 1.5 | 0.5 | 0.0 | 3.1 | 0.8 | 1.7 | 1.8 | 1.2 | 3.8 | 3.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.7 | 0.0 | 11.9 | 14.0 | 0.0 | 13.7 | 19.8 | 10.2 | 10.2 | 15.0 | 13.3 | 13.4 |
| LnGrp LOS | B | A | B | B | A | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 353 | | | 432 | | | 664 | | | 1170 | |
| Approach Delay, s/veh | | 14.9 | | | 13.7 | | | 11.3 | | | 13.6 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 27.4 | | 23.9 | | 27.4 | | 23.9 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 24.8 | | * 25 | | 24.8 | | * 25 | | | | |
| Max Q Clear Time (g_c+I1), s | | 20.6 | | 17.2 | | 15.4 | | 10.8 | | | | |
| Green Ext Time (p_c), s | | 1.6 | | 1.2 | | 4.8 | | 2.4 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 13.2 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Future Vol, veh/h | 0 | 3 | 3 | 4 | 11 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 3 | 4 | 12 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 7 | 0 | - | 0 | 8 | 5 |
| Stage 1 | - | - | - | - | 5 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1614 | - | - | - | 1013 | 1078 |
| Mov Cap-2 Maneuver | - | - | - | - | 1013 | - |
| Stage 1 | - | - | - | - | 1018 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1614 | - | - | - | 1013 |
| HCM Lane V/C Ratio | - | - | - | - | 0.012 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 30 | 19 | 9 | 26 | 0 |
| Future Vol, veh/h | 0 | 30 | 19 | 9 | 26 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 33 | 21 | 10 | 28 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 31 | 0 | - | 0 | 59 | 26 |
| Stage 1 | - | - | - | - | 26 | - |
| Stage 2 | - | - | - | - | 33 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1582 | - | - | - | 948 | 1050 |
| Stage 1 | - | - | - | - | 997 | - |
| Stage 2 | - | - | - | - | 989 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1582 | - | - | - | 948 | 1050 |
| Mov Cap-2 Maneuver | - | - | - | - | 948 | - |
| Stage 1 | - | - | - | - | 997 | - |
| Stage 2 | - | - | - | - | 989 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1582 | - | - | - | 948 |
| HCM Lane V/C Ratio | - | - | - | - | 0.03 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.2 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 53 | 21 | 5 | 23 | 15 |
| Future Vol, veh/h | 3 | 53 | 21 | 5 | 23 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 69 | 69 | 69 | 69 | 69 | 69 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 77 | 30 | 7 | 33 | 22 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 81 | 0 | 110 | 44 |
| Stage 1 | - | - | - | - | 43 | - |
| Stage 2 | - | - | - | - | 67 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1517 | - | 887 | 1026 |
| Stage 1 | - | - | - | - | 979 | - |
| Stage 2 | - | - | - | - | 956 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1517 | - | 869 | 1025 |
| Mov Cap-2 Maneuver | - | - | - | - | 869 | - |
| Stage 1 | - | - | - | - | 959 | - |
| Stage 2 | - | - | - | - | 956 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 6 | 9.1 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 925 | - | - | 1517 | - |
| HCM Lane V/C Ratio | 0.06 | - | - | 0.02 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 27 | 122 | 74 | 8 | 114 | 2 | 65 | 17 | 5 | 4 | 22 | 60 |
| Future Vol, veh/h | 27 | 122 | 74 | 8 | 114 | 2 | 65 | 17 | 5 | 4 | 22 | 60 |
| Conflicting Peds, #/hr | 0 | 0 | 21 | 0 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 1 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 35 | 156 | 95 | 10 | 146 | 3 | 83 | 22 | 6 | 5 | 28 | 77 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 151 | 0 | 0 | 272 | 0 | 0 | 516 | 466 | 229 | 462 | 512 | 151 |
| Stage 1 | - | - | - | - | - | - | 295 | 295 | - | 170 | 170 | - |
| Stage 2 | - | - | - | - | - | - | 221 | 171 | - | 292 | 342 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1430 | - | - | 1291 | - | - | 470 | 494 | 810 | 510 | 465 | 895 |
| Stage 1 | - | - | - | - | - | - | 713 | 669 | - | 832 | 758 | - |
| Stage 2 | - | - | - | - | - | - | 781 | 757 | - | 716 | 638 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1427 | - | - | 1265 | - | - | 388 | 465 | 791 | 471 | 438 | 892 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 388 | 465 | - | 471 | 438 | - |
| Stage 1 | - | - | - | - | - | - | 679 | 637 | - | 806 | 750 | - |
| Stage 2 | - | - | - | - | - | - | 680 | 749 | - | 663 | 607 | - |

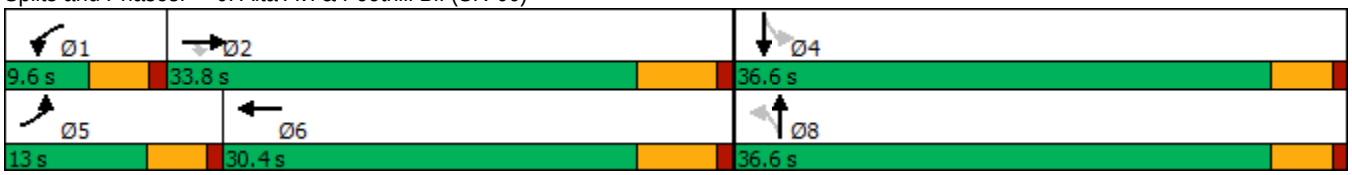
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.9 | 0.5 | 16.9 | 11.3 |
| HCM LOS | | | C | B |

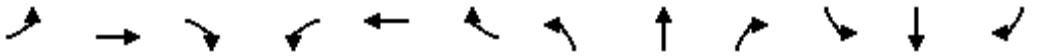
| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 413 | 1427 | - | - | 1265 | - | - | 683 |
| HCM Lane V/C Ratio | 0.27 | 0.024 | - | - | 0.008 | - | - | 0.161 |
| HCM Control Delay (s) | 16.9 | 7.6 | 0 | - | 7.9 | 0 | - | 11.3 |
| HCM Lane LOS | C | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 1.1 | 0.1 | - | - | 0 | - | - | 0.6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 225 | 621 | 23 | 15 | 837 | 13 | 8 | 175 | 14 |
| Future Volume (vph) | 225 | 621 | 23 | 15 | 837 | 13 | 8 | 175 | 14 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 33.8 | 33.8 | 9.6 | 30.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 16.3% | 42.3% | 42.3% | 12.0% | 38.0% | 45.8% | 45.8% | 45.8% | 45.8% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 64.2 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 225 | 621 | 23 | 15 | 837 | 176 | 13 | 8 | 6 | 175 | 14 | 190 |
| Future Volume (veh/h) | 225 | 621 | 23 | 15 | 837 | 176 | 13 | 8 | 6 | 175 | 14 | 190 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 253 | 698 | 23 | 17 | 940 | 189 | 15 | 9 | 5 | 197 | 16 | 192 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 258 | 1793 | 776 | 37 | 1120 | 225 | 164 | 90 | 33 | 410 | 26 | 315 |
| Arrive On Green | 0.14 | 0.50 | 0.50 | 0.02 | 0.38 | 0.38 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1781 | 3554 | 1539 | 1781 | 2944 | 591 | 324 | 416 | 154 | 1394 | 121 | 1457 |
| Grp Volume(v), veh/h | 253 | 698 | 23 | 17 | 567 | 562 | 29 | 0 | 0 | 197 | 0 | 208 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1539 | 1781 | 1777 | 1758 | 893 | 0 | 0 | 1394 | 0 | 1578 |
| Q Serve(g_s), s | 8.2 | 7.0 | 0.4 | 0.5 | 16.8 | 16.9 | 0.1 | 0.0 | 0.0 | 1.2 | 0.0 | 6.9 |
| Cycle Q Clear(g_c), s | 8.2 | 7.0 | 0.4 | 0.5 | 16.8 | 16.9 | 7.0 | 0.0 | 0.0 | 8.2 | 0.0 | 6.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.34 | 0.52 | | 0.17 | 1.00 | | 0.92 |
| Lane Grp Cap(c), veh/h | 258 | 1793 | 776 | 37 | 676 | 669 | 287 | 0 | 0 | 410 | 0 | 341 |
| V/C Ratio(X) | 0.98 | 0.39 | 0.03 | 0.46 | 0.84 | 0.84 | 0.10 | 0.00 | 0.00 | 0.48 | 0.00 | 0.61 |
| Avail Cap(c_a), veh/h | 258 | 1793 | 776 | 154 | 754 | 746 | 756 | 0 | 0 | 879 | 0 | 871 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 24.7 | 8.9 | 7.2 | 28.1 | 16.3 | 16.4 | 18.3 | 0.0 | 0.0 | 21.1 | 0.0 | 20.5 |
| Incr Delay (d2), s/veh | 50.1 | 0.1 | 0.0 | 3.3 | 7.7 | 7.8 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.6 | 2.0 | 0.1 | 0.2 | 6.8 | 6.7 | 0.3 | 0.0 | 0.0 | 2.4 | 0.0 | 2.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 74.8 | 9.0 | 7.2 | 31.4 | 24.0 | 24.2 | 18.4 | 0.0 | 0.0 | 21.4 | 0.0 | 21.2 |
| LnGrp LOS | E | A | A | C | C | C | B | A | A | C | A | C |
| Approach Vol, veh/h | | 974 | | | 1146 | | | 29 | | | 405 | |
| Approach Delay, s/veh | | 26.1 | | | 24.2 | | | 18.4 | | | 21.3 | |
| Approach LOS | | C | | | C | | | B | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.8 | 35.1 | | 17.1 | 13.0 | 27.8 | | 17.1 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 28.0 | | 32.0 | 8.4 | 24.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 9.0 | | 10.2 | 10.2 | 18.9 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 1.2 | 0.0 | 3.2 | | 0.1 | | | | |

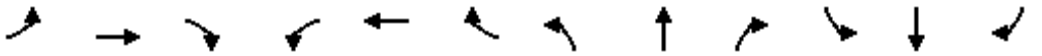
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 24.4 | |
| HCM 6th LOS | | C | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 20 | 584 | 163 | 149 | 799 | 190 | 79 | 172 | 116 | 92 | 21 |
| Future Volume (vph) | 20 | 584 | 163 | 149 | 799 | 190 | 79 | 172 | 116 | 92 | 21 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 12.0 | 33.0 | 33.0 | 25.0 | 46.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 |
| Total Split (%) | 12.0% | 33.0% | 33.0% | 25.0% | 46.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% | 42.0% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 100 |
| Actuated Cycle Length: 63.5 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 20 | 584 | 163 | 149 | 799 | 71 | 190 | 79 | 172 | 116 | 92 | 21 |
| Future Volume (veh/h) | 20 | 584 | 163 | 149 | 799 | 71 | 190 | 79 | 172 | 116 | 92 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.98 | 0.97 | | 0.99 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 22 | 642 | 155 | 164 | 878 | 69 | 209 | 87 | 159 | 127 | 101 | 11 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 47 | 1042 | 461 | 211 | 1285 | 101 | 483 | 557 | 465 | 436 | 1058 | 456 |
| Arrive On Green | 0.03 | 0.29 | 0.29 | 0.12 | 0.39 | 0.39 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| Sat Flow, veh/h | 1781 | 3554 | 1574 | 1781 | 3331 | 262 | 1246 | 1870 | 1563 | 1133 | 3554 | 1532 |
| Grp Volume(v), veh/h | 22 | 642 | 155 | 164 | 468 | 479 | 209 | 87 | 159 | 127 | 101 | 11 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1574 | 1781 | 1777 | 1816 | 1246 | 1870 | 1563 | 1133 | 1777 | 1532 |
| Q Serve(g_s), s | 0.6 | 8.2 | 4.0 | 4.7 | 11.5 | 11.5 | 7.6 | 1.8 | 4.2 | 4.9 | 1.1 | 0.3 |
| Cycle Q Clear(g_c), s | 0.6 | 8.2 | 4.0 | 4.7 | 11.5 | 11.5 | 8.7 | 1.8 | 4.2 | 6.7 | 1.1 | 0.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.14 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 47 | 1042 | 461 | 211 | 685 | 700 | 483 | 557 | 465 | 436 | 1058 | 456 |
| V/C Ratio(X) | 0.47 | 0.62 | 0.34 | 0.78 | 0.68 | 0.68 | 0.43 | 0.16 | 0.34 | 0.29 | 0.10 | 0.02 |
| Avail Cap(c_a), veh/h | 252 | 1848 | 818 | 695 | 1366 | 1395 | 998 | 1330 | 1112 | 907 | 2534 | 1093 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 15.9 | 14.5 | 22.4 | 13.4 | 13.4 | 16.4 | 13.5 | 14.4 | 16.0 | 13.3 | 13.0 |
| Incr Delay (d2), s/veh | 2.7 | 0.6 | 0.4 | 2.3 | 1.2 | 1.2 | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 2.7 | 1.2 | 1.8 | 3.6 | 3.7 | 1.8 | 0.6 | 1.2 | 1.1 | 0.4 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.9 | 16.5 | 14.9 | 24.7 | 14.6 | 14.6 | 16.7 | 13.6 | 14.5 | 16.1 | 13.3 | 13.0 |
| LnGrp LOS | C | B | B | C | B | B | B | B | B | B | B | B |
| Approach Vol, veh/h | | 819 | | | 1111 | | | 455 | | | 239 | |
| Approach Delay, s/veh | | 16.5 | | | 16.1 | | | 15.3 | | | 14.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 21.1 | | 20.4 | 6.0 | 26.0 | | 20.4 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 20.4 | 27.2 | | * 37 | 7.4 | 40.2 | | * 37 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.7 | 10.2 | | 8.7 | 2.6 | 13.5 | | 10.7 | | | | |
| Green Ext Time (p_c), s | 0.2 | 4.2 | | 0.7 | 0.0 | 6.0 | | 0.9 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 16.0 | |
| HCM 6th LOS | | B | |

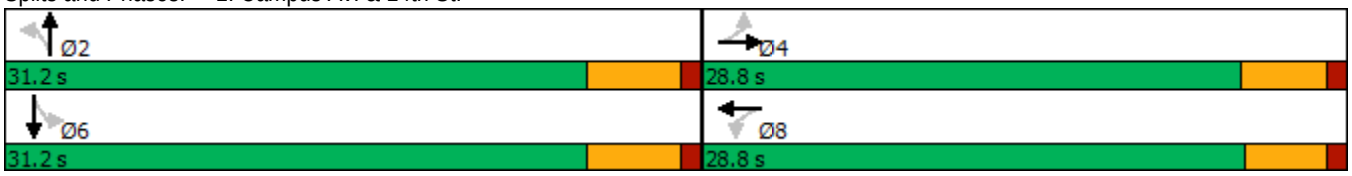
Notes

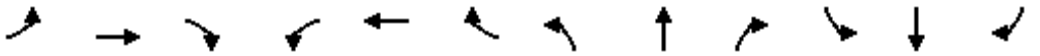
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 208 | 227 | 44 | 189 | 62 | 893 | 168 | 612 |
| Future Volume (vph) | 208 | 227 | 44 | 189 | 62 | 893 | 168 | 612 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 27.8 | 27.8 | 28.8 | 28.8 | 27.2 | 27.2 | 27.2 | 27.2 |
| Total Split (s) | 28.8 | 28.8 | 28.8 | 28.8 | 31.2 | 31.2 | 31.2 | 31.2 |
| Total Split (%) | 48.0% | 48.0% | 48.0% | 48.0% | 52.0% | 52.0% | 52.0% | 52.0% |
| Yellow Time (s) | 3.8 | 3.8 | 3.6 | 3.6 | 4.2 | 4.2 | 4.2 | 4.2 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.8 | 4.8 | 4.6 | 4.6 | 5.2 | 5.2 | 5.2 | 5.2 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | Min | Min | Min | Min |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 52 |
| Natural Cycle: 70 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 208 | 227 | 42 | 44 | 189 | 139 | 62 | 893 | 66 | 168 | 612 | 143 |
| Future Volume (veh/h) | 208 | 227 | 42 | 44 | 189 | 139 | 62 | 893 | 66 | 168 | 612 | 143 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 221 | 241 | 39 | 47 | 201 | 118 | 66 | 950 | 61 | 179 | 651 | 148 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 383 | 599 | 97 | 420 | 422 | 248 | 317 | 1511 | 97 | 252 | 1283 | 291 |
| Arrive On Green | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| Sat Flow, veh/h | 1061 | 1566 | 253 | 1097 | 1105 | 649 | 680 | 3385 | 217 | 558 | 2876 | 653 |
| Grp Volume(v), veh/h | 221 | 0 | 280 | 47 | 0 | 319 | 66 | 499 | 512 | 179 | 402 | 397 |
| Grp Sat Flow(s),veh/h/ln | 1061 | 0 | 1820 | 1097 | 0 | 1754 | 680 | 1777 | 1826 | 558 | 1777 | 1752 |
| Q Serve(g_s), s | 11.6 | 0.0 | 6.5 | 1.9 | 0.0 | 8.0 | 4.5 | 12.6 | 12.6 | 13.4 | 9.4 | 9.5 |
| Cycle Q Clear(g_c), s | 19.6 | 0.0 | 6.5 | 8.5 | 0.0 | 8.0 | 13.9 | 12.6 | 12.6 | 26.0 | 9.4 | 9.5 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.37 | 1.00 | | 0.12 | 1.00 | | 0.37 |
| Lane Grp Cap(c), veh/h | 383 | 0 | 695 | 420 | 0 | 670 | 317 | 793 | 815 | 252 | 793 | 782 |
| V/C Ratio(X) | 0.58 | 0.00 | 0.40 | 0.11 | 0.00 | 0.48 | 0.21 | 0.63 | 0.63 | 0.71 | 0.51 | 0.51 |
| Avail Cap(c_a), veh/h | 415 | 0 | 750 | 456 | 0 | 728 | 317 | 793 | 815 | 252 | 793 | 782 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 21.0 | 0.0 | 13.1 | 16.2 | 0.0 | 13.6 | 16.5 | 12.4 | 12.4 | 24.3 | 11.5 | 11.6 |
| Incr Delay (d2), s/veh | 1.7 | 0.0 | 0.4 | 0.1 | 0.0 | 0.5 | 0.3 | 1.6 | 1.6 | 9.0 | 0.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 0.0 | 2.4 | 0.5 | 0.0 | 3.0 | 0.6 | 4.3 | 4.4 | 2.9 | 3.0 | 3.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.7 | 0.0 | 13.5 | 16.3 | 0.0 | 14.1 | 16.9 | 14.0 | 14.0 | 33.3 | 12.1 | 12.1 |
| LnGrp LOS | C | A | B | B | A | B | B | B | B | C | B | B |
| Approach Vol, veh/h | | 501 | | | 366 | | | 1077 | | | 978 | |
| Approach Delay, s/veh | | 17.6 | | | 14.4 | | | 14.2 | | | 16.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 31.2 | | 27.1 | | 31.2 | | 27.1 | | | | |
| Change Period (Y+Rc), s | | 5.2 | | * 4.8 | | 5.2 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | * 24 | | 26.0 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | | 15.9 | | 21.6 | | 28.0 | | 10.5 | | | | |
| Green Ext Time (p_c), s | | 4.7 | | 0.7 | | 0.0 | | 1.9 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 15.4 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Intersection | |
|---|---|
| Int Delay, s/veh | 2 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 3 | 8 | 12 | 7 | 0 |
| Future Vol, veh/h | 0 | 3 | 8 | 12 | 7 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 3 | 9 | 13 | 8 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 22 | 0 | - | 0 | 19 | 16 |
| Stage 1 | - | - | - | - | 16 | - |
| Stage 2 | - | - | - | - | 3 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1593 | - | - | - | 998 | 1063 |
| Stage 1 | - | - | - | - | 1007 | - |
| Stage 2 | - | - | - | - | 1020 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1593 | - | - | - | 998 | 1063 |
| Mov Cap-2 Maneuver | - | - | - | - | 998 | - |
| Stage 1 | - | - | - | - | 1007 | - |
| Stage 2 | - | - | - | - | 1020 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1593 | - | - | - | 998 |
| HCM Lane V/C Ratio | - | - | - | - | 0.008 |
| HCM Control Delay (s) | 0 | - | - | - | 8.6 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 17 | 28 | 29 | 17 | 0 |
| Future Vol, veh/h | 0 | 17 | 28 | 29 | 17 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 18 | 30 | 32 | 18 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 62 | 0 | - | 0 | 64 | 46 |
| Stage 1 | - | - | - | - | 46 | - |
| Stage 2 | - | - | - | - | 18 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1541 | - | - | - | 942 | 1023 |
| Stage 1 | - | - | - | - | 976 | - |
| Stage 2 | - | - | - | - | 1005 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1541 | - | - | - | 942 | 1023 |
| Mov Cap-2 Maneuver | - | - | - | - | 942 | - |
| Stage 1 | - | - | - | - | 976 | - |
| Stage 2 | - | - | - | - | 1005 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 8.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1541 | - | - | - | 942 |
| HCM Lane V/C Ratio | - | - | - | - | 0.02 |
| HCM Control Delay (s) | 0 | - | - | - | 8.9 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 7 | 27 | 8 | 8 | 49 | 13 |
| Future Vol, veh/h | 7 | 27 | 8 | 8 | 49 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 8 | 31 | 9 | 9 | 57 | 15 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 39 | 0 | 51 | 24 |
| Stage 1 | - | - | - | - | 24 | - |
| Stage 2 | - | - | - | - | 27 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1571 | - | 958 | 1052 |
| Stage 1 | - | - | - | - | 999 | - |
| Stage 2 | - | - | - | - | 996 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1571 | - | 952 | 1052 |
| Mov Cap-2 Maneuver | - | - | - | - | 952 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 996 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 3.7 | 9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 971 | - | - | 1571 | - |
| HCM Lane V/C Ratio | 0.074 | - | - | 0.006 | - |
| HCM Control Delay (s) | 9 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ⇕ | | | ⇕ | | | ⇕ | | | ⇕ | |
| Traffic Vol, veh/h | 53 | 202 | 42 | 3 | 244 | 4 | 50 | 21 | 4 | 1 | 9 | 35 |
| Future Vol, veh/h | 53 | 202 | 42 | 3 | 244 | 4 | 50 | 21 | 4 | 1 | 9 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 | 86 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 62 | 235 | 49 | 3 | 284 | 5 | 58 | 24 | 5 | 1 | 10 | 41 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 290 | 0 | 0 | 287 | 0 | 0 | 705 | 683 | 263 | 692 | 705 | 288 |
| Stage 1 | - | - | - | - | - | - | 387 | 387 | - | 294 | 294 | - |
| Stage 2 | - | - | - | - | - | - | 318 | 296 | - | 398 | 411 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1272 | - | - | 1275 | - | - | 351 | 372 | 776 | 358 | 361 | 751 |
| Stage 1 | - | - | - | - | - | - | 637 | 610 | - | 714 | 670 | - |
| Stage 2 | - | - | - | - | - | - | 693 | 668 | - | 628 | 595 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1271 | - | - | 1271 | - | - | 308 | 348 | 774 | 321 | 338 | 750 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 308 | 348 | - | 321 | 338 | - |
| Stage 1 | - | - | - | - | - | - | 598 | 573 | - | 672 | 667 | - |
| Stage 2 | - | - | - | - | - | - | 643 | 665 | - | 563 | 559 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.4 | 0.1 | 19.8 | 11.7 |
| HCM LOS | | | C | B |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 329 | 1271 | - | - | 1271 | - | - | 589 |
| HCM Lane V/C Ratio | 0.265 | 0.048 | - | - | 0.003 | - | - | 0.089 |
| HCM Control Delay (s) | 19.8 | 8 | 0 | - | 7.8 | 0 | - | 11.7 |
| HCM Lane LOS | C | A | A | - | A | A | - | B |
| HCM 95th %tile Q(veh) | 1 | 0.2 | - | - | 0 | - | - | 0.3 |

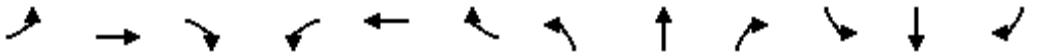
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 226 | 1510 | 21 | 17 | 959 | 15 | 19 | 195 | 17 |
| Future Volume (vph) | 226 | 1510 | 21 | 17 | 959 | 15 | 19 | 195 | 17 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | 4 |
| Permitted Phases | | | 2 | | | 8 | | 4 | |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 4 | 4 |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 27.8 | 33.6 | 33.6 | 36.6 | 36.6 |
| Total Split (s) | 13.0 | 43.8 | 43.8 | 9.6 | 40.4 | 36.6 | 36.6 | 36.6 | 36.6 |
| Total Split (%) | 14.4% | 48.7% | 48.7% | 10.7% | 44.9% | 40.7% | 40.7% | 40.7% | 40.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.6 | 3.6 | 3.6 | 3.6 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | | 4.6 | 4.6 | 4.6 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 90
Actuated Cycle Length: 71.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Alta Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 226 | 1510 | 21 | 17 | 959 | 145 | 15 | 19 | 21 | 195 | 17 | 195 |
| Future Volume (veh/h) | 226 | 1510 | 21 | 17 | 959 | 145 | 15 | 19 | 21 | 195 | 17 | 195 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.97 | 1.00 | | 0.99 | 0.99 | | 0.99 | 0.99 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 240 | 1606 | 21 | 18 | 1020 | 150 | 16 | 20 | 10 | 207 | 18 | 151 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 221 | 1854 | 802 | 38 | 1299 | 191 | 148 | 171 | 69 | 416 | 40 | 337 |
| Arrive On Green | 0.12 | 0.52 | 0.52 | 0.02 | 0.42 | 0.42 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Sat Flow, veh/h | 1781 | 3554 | 1538 | 1781 | 3102 | 456 | 325 | 725 | 292 | 1365 | 170 | 1428 |
| Grp Volume(v), veh/h | 240 | 1606 | 21 | 18 | 584 | 586 | 46 | 0 | 0 | 207 | 0 | 169 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1538 | 1781 | 1777 | 1781 | 1343 | 0 | 0 | 1365 | 0 | 1598 |
| Q Serve(g_s), s | 8.4 | 26.7 | 0.4 | 0.7 | 19.3 | 19.3 | 0.1 | 0.0 | 0.0 | 3.8 | 0.0 | 6.1 |
| Cycle Q Clear(g_c), s | 8.4 | 26.7 | 0.4 | 0.7 | 19.3 | 19.3 | 6.2 | 0.0 | 0.0 | 10.0 | 0.0 | 6.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.26 | 0.35 | | 0.22 | 1.00 | | 0.89 |
| Lane Grp Cap(c), veh/h | 221 | 1854 | 802 | 38 | 744 | 746 | 388 | 0 | 0 | 416 | 0 | 377 |
| V/C Ratio(X) | 1.09 | 0.87 | 0.03 | 0.48 | 0.78 | 0.79 | 0.12 | 0.00 | 0.00 | 0.50 | 0.00 | 0.45 |
| Avail Cap(c_a), veh/h | 221 | 1993 | 863 | 131 | 908 | 910 | 747 | 0 | 0 | 739 | 0 | 755 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 29.7 | 14.1 | 7.9 | 32.8 | 17.0 | 17.1 | 20.4 | 0.0 | 0.0 | 23.7 | 0.0 | 22.1 |
| Incr Delay (d2), s/veh | 85.5 | 4.1 | 0.0 | 3.4 | 3.7 | 3.8 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 8.5 | 9.0 | 0.1 | 0.3 | 7.2 | 7.2 | 0.6 | 0.0 | 0.0 | 2.9 | 0.0 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 115.2 | 18.2 | 7.9 | 36.2 | 20.8 | 20.8 | 20.4 | 0.0 | 0.0 | 24.0 | 0.0 | 22.4 |
| LnGrp LOS | F | B | A | D | C | C | C | A | A | C | A | C |
| Approach Vol, veh/h | | 1867 | | | 1188 | | | 46 | | | 376 | |
| Approach Delay, s/veh | | 30.6 | | | 21.0 | | | 20.4 | | | 23.3 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.0 | 41.1 | | 20.6 | 13.0 | 34.2 | | 20.6 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | 4.6 | 4.6 | 5.8 | | 4.6 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 38.0 | | 32.0 | 8.4 | 34.6 | | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 28.7 | | 12.0 | 10.4 | 21.3 | | 8.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.6 | | 1.0 | 0.0 | 5.9 | | 0.1 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 26.4 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

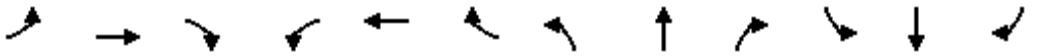
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 50 | 1282 | 244 | 110 | 826 | 215 | 208 | 240 | 207 | 153 | 37 |
| Future Volume (vph) | 50 | 1282 | 244 | 110 | 826 | 215 | 208 | 240 | 207 | 153 | 37 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | | | 4 | |
| Permitted Phases | | | 2 | | | 8 | | 8 | 4 | | 4 |
| Detector Phase | 5 | 2 | 2 | 1 | 6 | 8 | 8 | 8 | 4 | 4 | 4 |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 9.6 | 27.8 | 27.8 | 9.6 | 35.8 | 14.8 | 14.8 | 14.8 | 39.7 | 39.7 | 39.7 |
| Total Split (s) | 10.3 | 46.3 | 46.3 | 14.0 | 50.0 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Total Split (%) | 10.3% | 46.3% | 46.3% | 14.0% | 50.0% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% | 39.7% |
| Yellow Time (s) | 3.6 | 4.8 | 4.8 | 3.6 | 4.8 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 5.8 | 4.6 | 5.8 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Recall Mode | None | None | None | None | None | Min | Min | Min | Min | Min | Min |

**Intersection Summary**

Cycle Length: 100
Actuated Cycle Length: 85.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Grove Av. & Foothill Bl. (SR-66)





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 50 | 1282 | 244 | 110 | 826 | 162 | 215 | 208 | 240 | 207 | 153 | 37 |
| Future Volume (veh/h) | 50 | 1282 | 244 | 110 | 826 | 162 | 215 | 208 | 240 | 207 | 153 | 37 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 0.98 | 0.99 | | 1.00 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 53 | 1364 | 219 | 117 | 879 | 152 | 229 | 221 | 181 | 220 | 163 | 26 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 71 | 1485 | 652 | 146 | 1388 | 240 | 440 | 635 | 538 | 323 | 1206 | 524 |
| Arrive On Green | 0.04 | 0.42 | 0.42 | 0.08 | 0.46 | 0.46 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| Sat Flow, veh/h | 1781 | 3554 | 1561 | 1781 | 3017 | 522 | 1183 | 1870 | 1585 | 983 | 3554 | 1544 |
| Grp Volume(v), veh/h | 53 | 1364 | 219 | 117 | 518 | 513 | 229 | 221 | 181 | 220 | 163 | 26 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 1561 | 1781 | 1777 | 1762 | 1183 | 1870 | 1585 | 983 | 1777 | 1544 |
| Q Serve(g_s), s | 2.8 | 34.2 | 9.0 | 6.1 | 21.0 | 21.0 | 15.7 | 8.4 | 8.0 | 20.4 | 3.0 | 1.1 |
| Cycle Q Clear(g_c), s | 2.8 | 34.2 | 9.0 | 6.1 | 21.0 | 21.0 | 18.7 | 8.4 | 8.0 | 28.7 | 3.0 | 1.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.30 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 71 | 1485 | 652 | 146 | 817 | 810 | 440 | 635 | 538 | 323 | 1206 | 524 |
| V/C Ratio(X) | 0.75 | 0.92 | 0.34 | 0.80 | 0.63 | 0.63 | 0.52 | 0.35 | 0.34 | 0.68 | 0.14 | 0.05 |
| Avail Cap(c_a), veh/h | 108 | 1525 | 670 | 177 | 832 | 825 | 476 | 692 | 586 | 354 | 1318 | 573 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.8 | 26.0 | 18.6 | 42.6 | 19.4 | 19.4 | 28.1 | 23.4 | 23.3 | 34.1 | 21.6 | 21.0 |
| Incr Delay (d2), s/veh | 5.8 | 9.2 | 0.3 | 15.8 | 1.5 | 1.6 | 0.4 | 0.1 | 0.1 | 3.5 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.3 | 14.8 | 3.0 | 3.2 | 8.1 | 8.0 | 4.3 | 3.5 | 2.9 | 5.1 | 1.2 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 50.6 | 35.1 | 18.9 | 58.4 | 21.0 | 21.0 | 28.4 | 23.5 | 23.4 | 37.7 | 21.6 | 21.0 |
| LnGrp LOS | D | D | B | E | C | C | C | C | C | D | C | C |
| Approach Vol, veh/h | | 1636 | | | 1148 | | | 631 | | | 409 | |
| Approach Delay, s/veh | | 33.4 | | | 24.8 | | | 25.2 | | | 30.2 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 12.3 | 45.2 | | 36.8 | 8.4 | 49.2 | | 36.8 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.8 | | * 4.8 | 4.6 | 5.8 | | * 4.8 | | | | |
| Max Green Setting (Gmax), s | 9.4 | 40.5 | | * 35 | 5.7 | 44.2 | | * 35 | | | | |
| Max Q Clear Time (g_c+I1), s | 8.1 | 36.2 | | 30.7 | 4.8 | 23.0 | | 20.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.2 | | 0.6 | 0.0 | 6.3 | | 1.3 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 29.1 |
| HCM 6th LOS | C |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

# APPENDIX 7.3:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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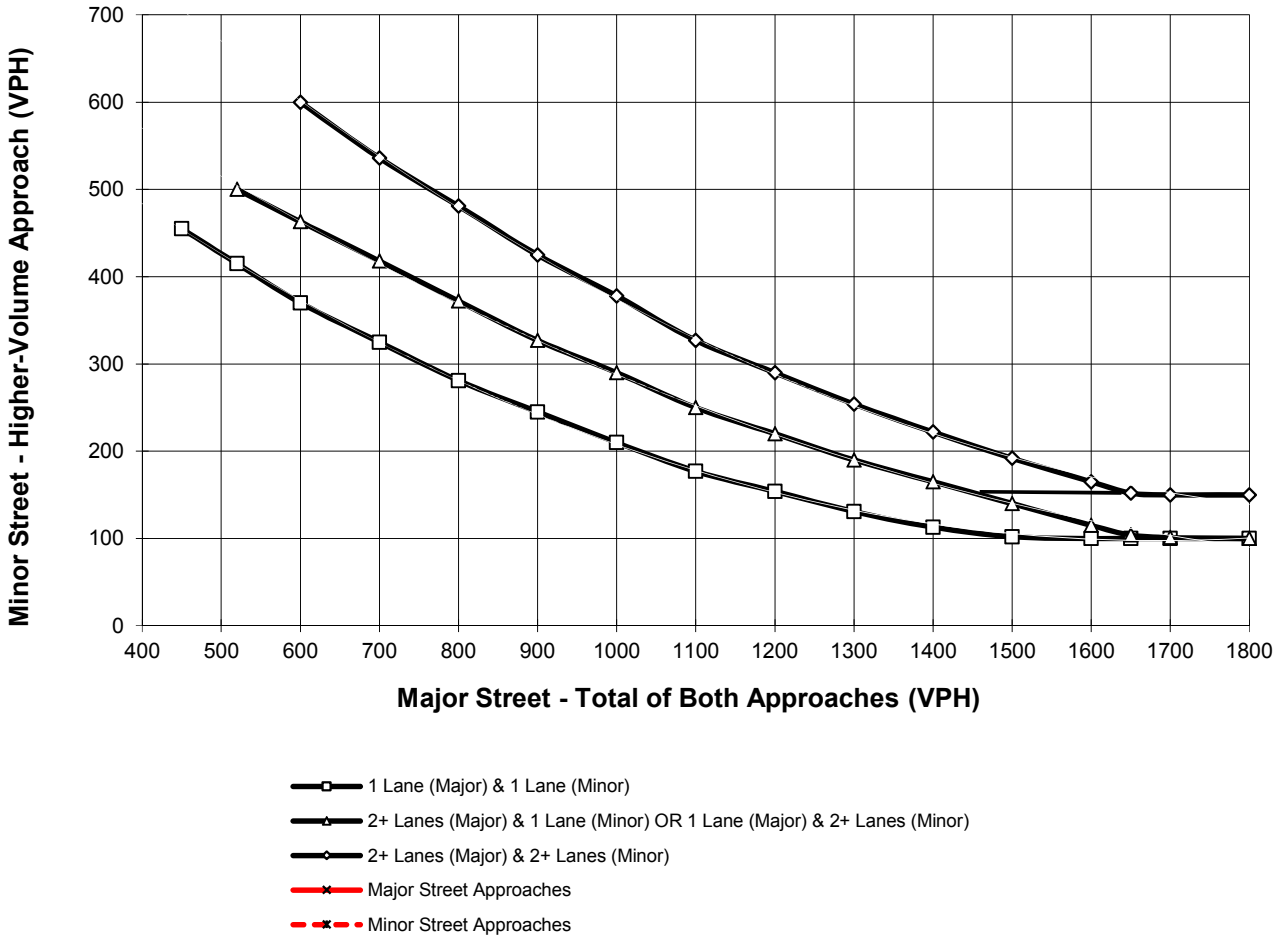
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **45**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **25**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

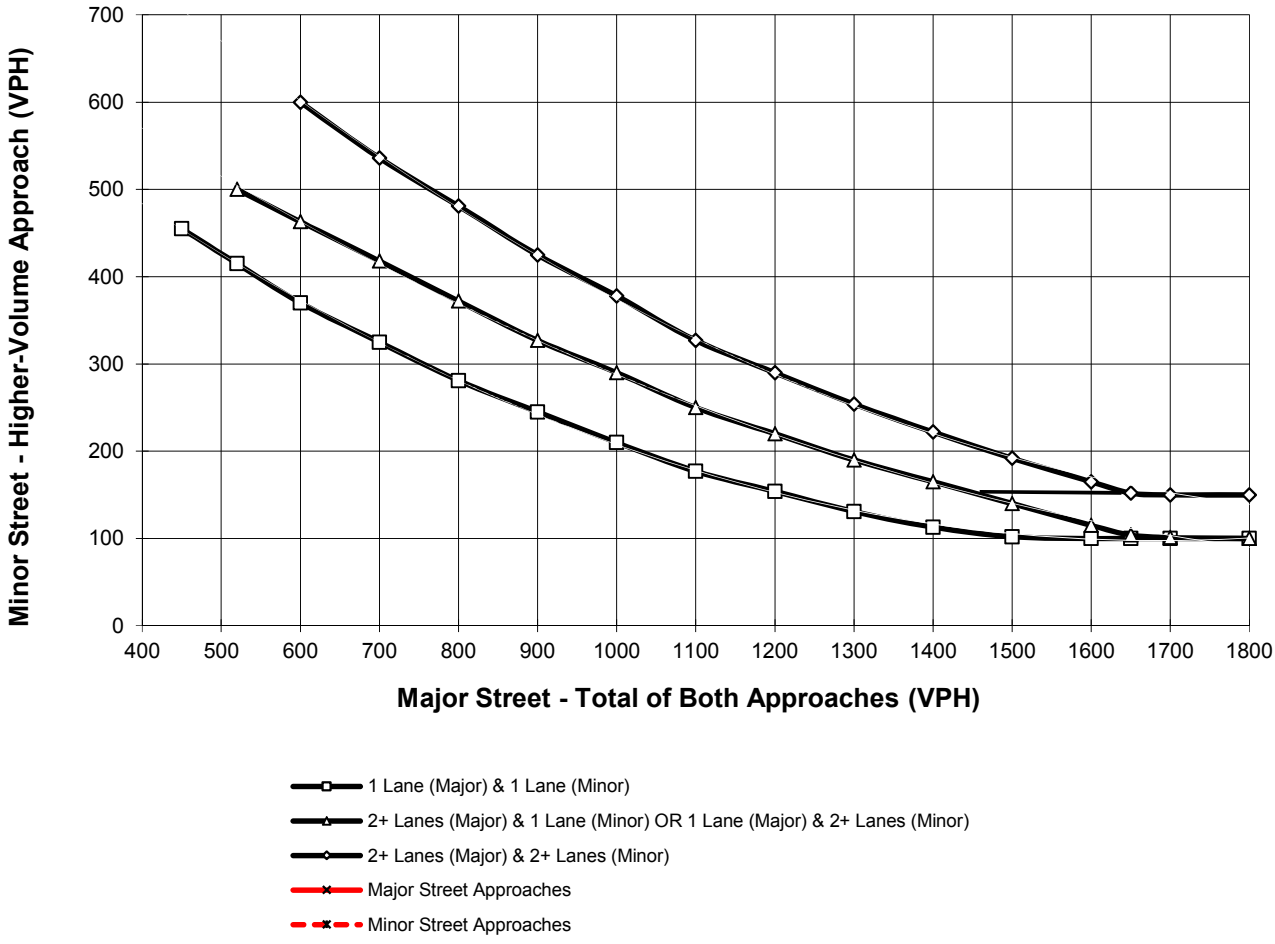
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **337**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **84**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 7.4:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 With Project Conditions - Weekday AM Peak Hour**

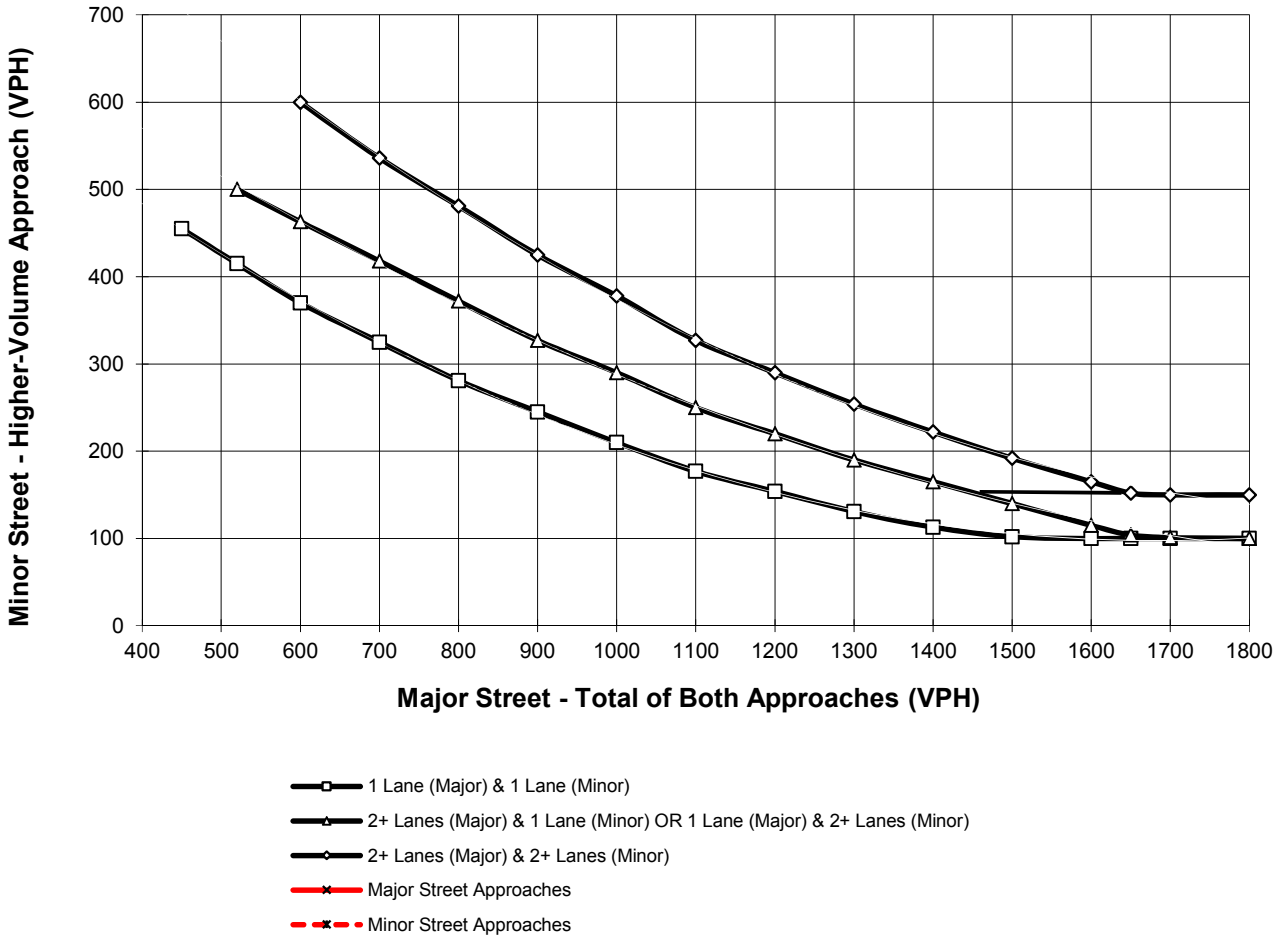
Major Street Name = **15th Street**

Total of Both Approaches (VPH) = **10**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 1**

High Volume Approach (VPH) = **11**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

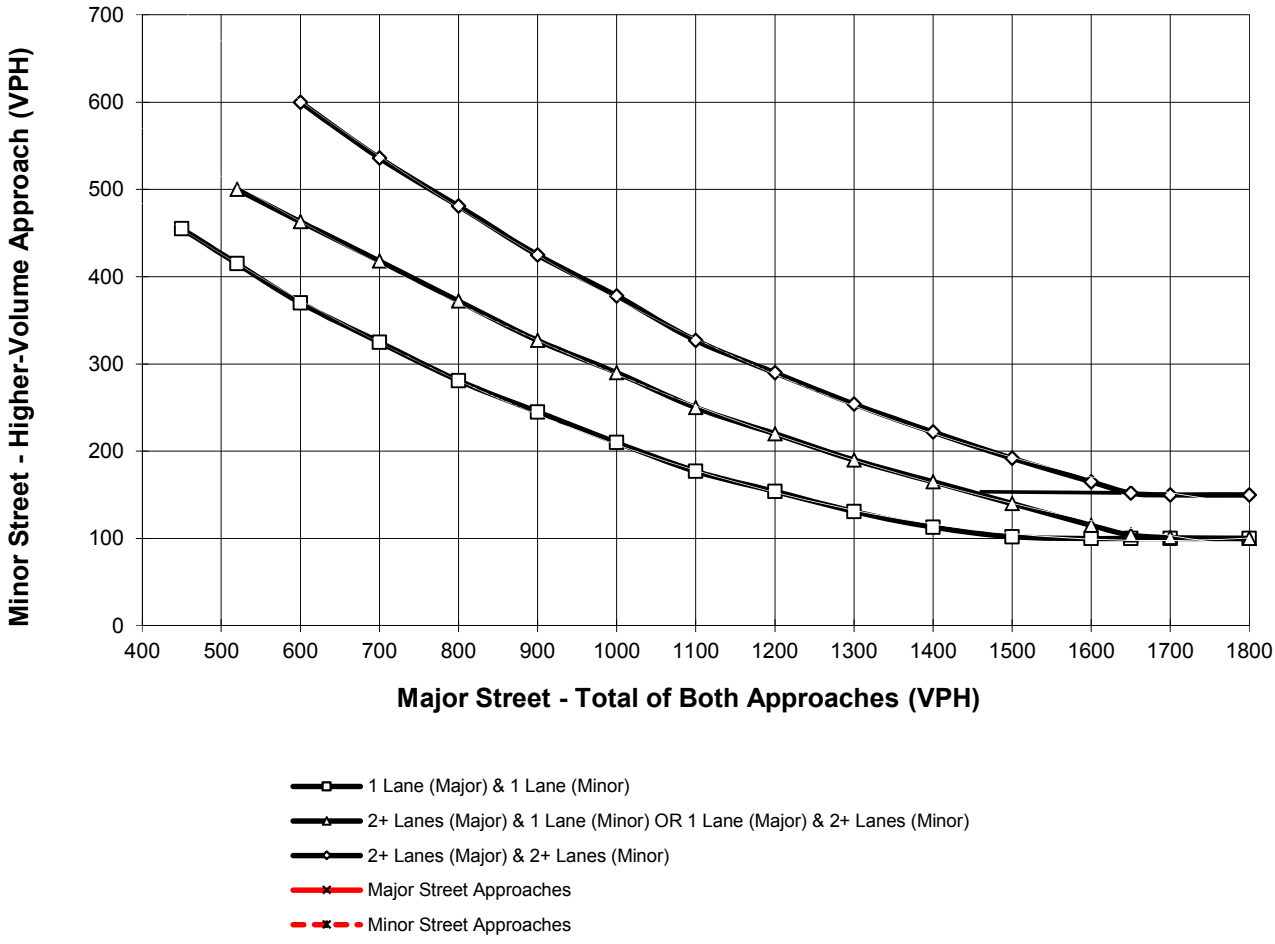
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 With Project Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **58**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Driveway 2**
High Volume Approach (VPH) = **26**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

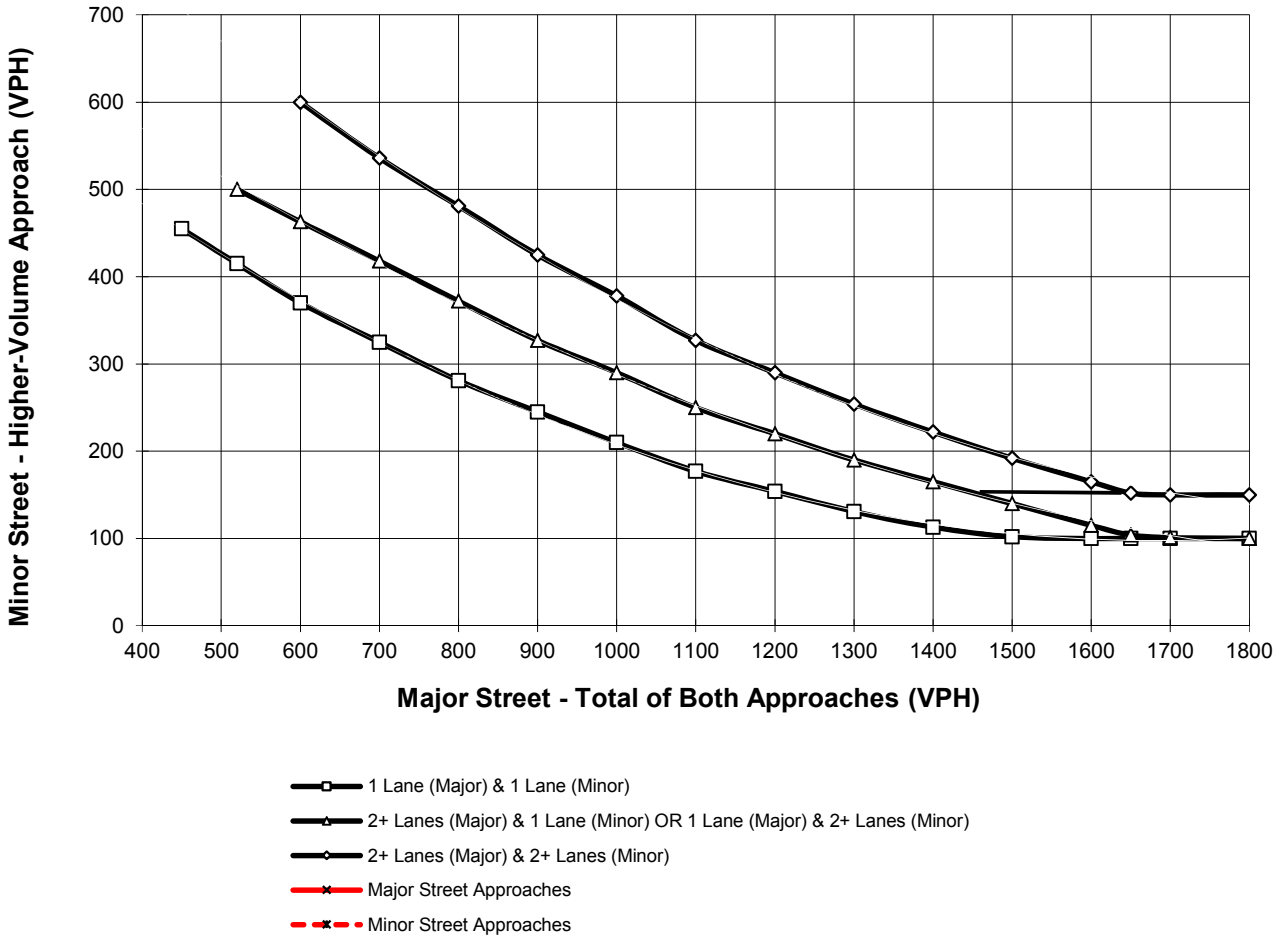
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 With Project Conditions - Weekday AM Peak Hour**

Major Street Name = **15th Street**
Total of Both Approaches (VPH) = **82**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **38**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

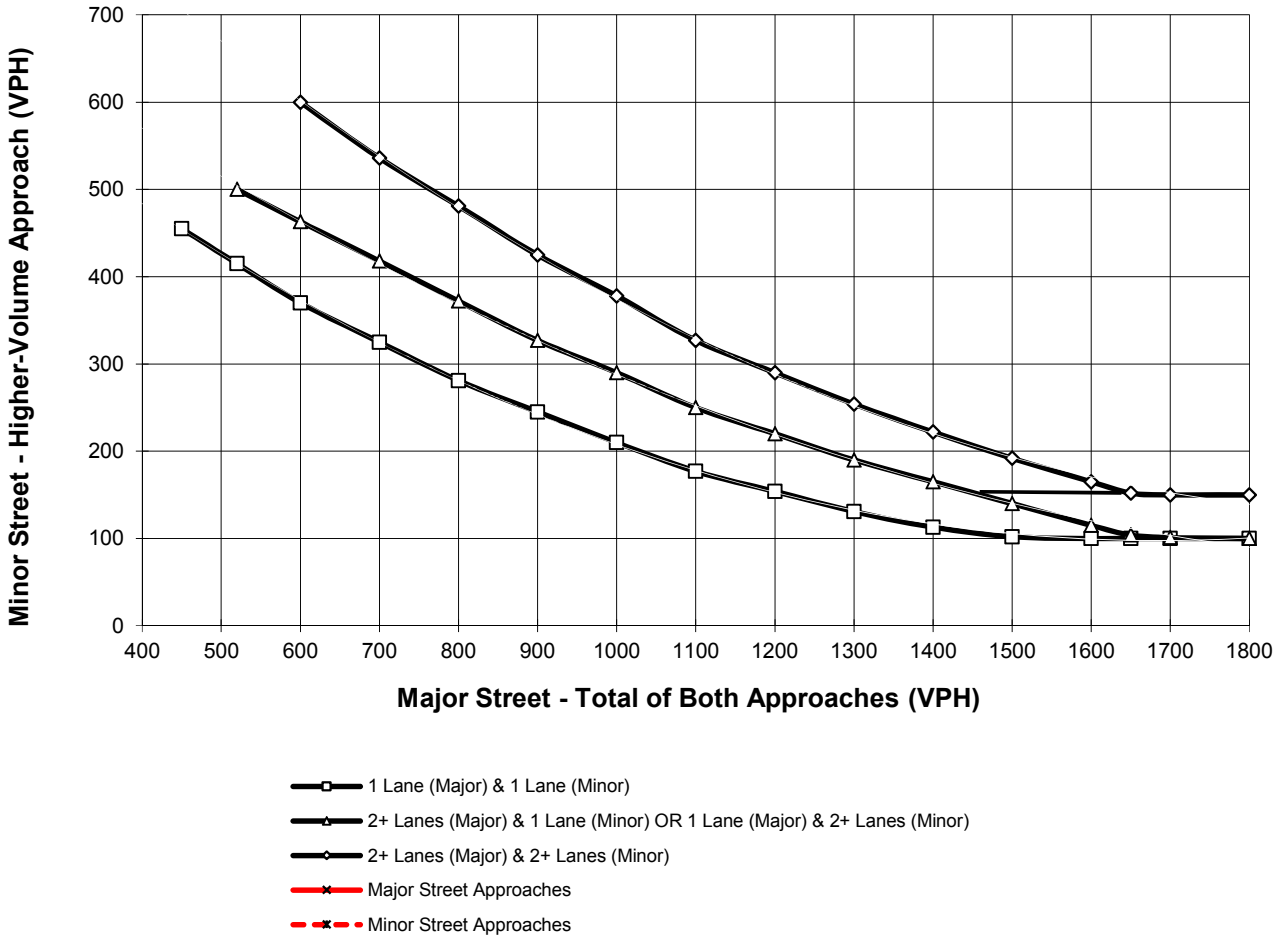
## Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2040 With Project Conditions - Weekday AM Peak Hour**

Major Street Name = **14th Street**
Total of Both Approaches (VPH) = **355**
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Alta Avenue**
High Volume Approach (VPH) = **87**
Number of Approach Lanes On Minor Street = **1**

**SIGNAL WARRANT NOT SATISFIED**




*Note: 150 vph applies as the lower threshold for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold for a minor-street approach with one lane

# APPENDIX 7.5:

# HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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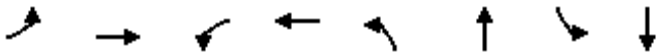
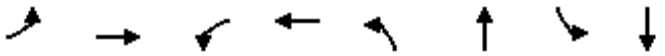


| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 137 | 220 | 51 | 383 | 79 | 586 | 146 | 1020 |
| v/c Ratio | 0.55 | 0.36 | 0.13 | 0.61 | 0.47 | 0.38 | 0.41 | 0.66 |
| Control Delay | 22.8 | 10.0 | 12.2 | 14.7 | 21.9 | 9.6 | 14.2 | 12.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.8 | 10.0 | 12.2 | 14.7 | 21.9 | 9.6 | 14.2 | 12.3 |
| Queue Length 50th (ft) | 29 | 27 | 9 | 61 | 12 | 43 | 22 | 85 |
| Queue Length 95th (ft) | 75 | 68 | 28 | 131 | #63 | 100 | 76 | 187 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 451 | 1041 | 686 | 1059 | 222 | 2037 | 465 | 2007 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.30 | 0.21 | 0.07 | 0.36 | 0.36 | 0.29 | 0.31 | 0.51 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 221 | 280 | 41 | 334 | 66 | 1012 | 162 | 803 |
| v/c Ratio | 0.80 | 0.46 | 0.12 | 0.53 | 0.24 | 0.60 | 0.85 | 0.48 |
| Control Delay | 39.1 | 15.3 | 12.6 | 14.8 | 13.4 | 13.1 | 59.0 | 10.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.1 | 15.3 | 12.6 | 14.8 | 13.4 | 13.1 | 59.0 | 10.9 |
| Queue Length 50th (ft) | 63 | 64 | 9 | 68 | 12 | 120 | 45 | 82 |
| Queue Length 95th (ft) | #158 | 116 | 26 | 129 | 41 | 202 | #161 | 144 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 370 | 817 | 440 | 816 | 272 | 1696 | 190 | 1682 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.60 | 0.34 | 0.09 | 0.41 | 0.24 | 0.60 | 0.85 | 0.48 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# APPENDIX 7.6:

# HORIZON YEAR (2040) WITH PROJECT CONDITIONS QUEUING ANALYSIS WORKSHEETS

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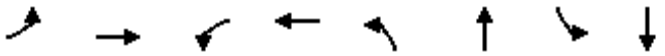
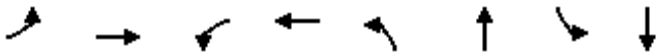


| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 137 | 222 | 59 | 407 | 79 | 590 | 152 | 1020 |
| v/c Ratio | 0.57 | 0.35 | 0.15 | 0.63 | 0.49 | 0.39 | 0.44 | 0.67 |
| Control Delay | 23.8 | 9.8 | 12.2 | 14.9 | 24.3 | 10.1 | 15.5 | 13.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.8 | 9.8 | 12.2 | 14.9 | 24.3 | 10.1 | 15.5 | 13.0 |
| Queue Length 50th (ft) | 30 | 28 | 11 | 68 | 13 | 47 | 25 | 94 |
| Queue Length 95th (ft) | 76 | 68 | 31 | 139 | #70 | 105 | 83 | 195 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 413 | 1022 | 671 | 1039 | 212 | 1994 | 451 | 1967 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.33 | 0.22 | 0.09 | 0.39 | 0.37 | 0.30 | 0.34 | 0.52 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 221 | 286 | 47 | 349 | 66 | 1020 | 179 | 803 |
| v/c Ratio | 0.97 | 0.51 | 0.16 | 0.61 | 0.23 | 0.58 | 0.87 | 0.46 |
| Control Delay | 71.7 | 16.9 | 13.8 | 17.2 | 11.8 | 11.5 | 58.0 | 9.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 71.7 | 16.9 | 13.8 | 17.2 | 11.8 | 11.5 | 58.0 | 9.6 |
| Queue Length 50th (ft) | 65 | 65 | 10 | 72 | 10 | 101 | 43 | 67 |
| Queue Length 95th (ft) | #169 | 119 | 29 | 136 | 40 | 204 | #175 | 144 |
| Internal Link Dist (ft) | | 1938 | | 2704 | | 2588 | | 1266 |
| Turn Bay Length (ft) | 60 | | 80 | | 100 | | 100 | |
| Base Capacity (vph) | 354 | 854 | 445 | 849 | 293 | 1772 | 206 | 1756 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.62 | 0.33 | 0.11 | 0.41 | 0.23 | 0.58 | 0.87 | 0.46 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

June 6, 2019

Mr. Ponce Yambot
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

**SUBJECT: UPLAND COLONIES (VILLA SERENA) TRAFFIC IMPACT ANALYSIS RESPONSE TO COMMENTS**

Dear Mr. Ponce Yambot:

This Response to Comments letter has been prepared for the Upland Colonies Traffic Impact Analysis (dated August 23, 2018), which is located north of 15th Street, between Himalayas Circle and Monte Verde Avenue in the City of Upland. A copy of the City's December 31, 2018 comment letter is provided in Attachment A.

## COMMENT #1

1.1 PROJECT OVERVIEW

Unit count, trip generation and site access driveways are not consistent with Appendix 1.1

## RESPONSE #1

The approved scoping agreement included the development of 85 single family residential dwelling units. The Project evaluated the development of 66 single family residential dwelling units in the traffic study. The traffic study, although evaluating fewer dwelling units, conservatively continues to evaluate the same study area identified in the approved scoping agreement (see Appendix 1.1).

## COMMENT #2

Exhibit 1-1 Preliminary Site Plan does not match Appendix 1.1

## RESPONSE #2

The site plan was updated after the scoping agreement was approved and while the analysis was under way. However, the site plan changes included a reduction to the number of dwelling units. The traffic study conservatively continues to evaluate the study area identified with the 85 single family residential dwelling units originally proposed in the scoping agreement.

**COMMENT #3**

1.2 STUDY INTERSECTIONS

Eleven (11) are noted in text, seven (7) are shown in Table 1-1

**RESPONSE #3**

Report text had a typo. Text now correctly references 7 intersections.

**COMMENT #4**

Table 1-1 does not match Appendix 1.1

**RESPONSE #4**

Table 1-1 does match Appendix 1.1. The City had added 2 intersections (Alta at Foothill and Grove at Foothill) to the scoping agreement (see page 2 of Appendix 1.1). These intersections are reflected in the traffic study, but are not shown in the graphics in Appendix 1.1 because they were added afterwards.

**COMMENT #5**

Exhibit 1:2 does not match Appendix 1.1

**RESPONSE #5**

The City added 2 intersections to the study area (see handwritten intersections on page 2 of Appendix 1.1). These are not shown in the exhibits in the scoping agreement, but were added to the study area for the purposes of the traffic study.

**COMMENT #6**

Exhibit 1-3 does not match Appendix 1.1

**RESPONSE #6**

Exhibit 1-3 was not included in the scoping agreement. It reflects a summary of the peak hour operations analysis. The study area intersections evaluated includes the 2 locations added by the City.

**COMMENT #7**

Exhibit 1-4 does not match Appendix 1.1

**RESPONSE #7**

See Response #2.

**COMMENT #8**

1.7 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Site access does not match the Scoping Agreement which aligns one (1) driveway with 13th Street

**RESPONSE #8**

The revised site plan shows a slight off-set from 13th Avenue to Driveway 2 (approximately 89 feet centerline-to-centerline). The space is sufficient to accommodate up to 2 vehicles, which is more than adequate to serve the peak hour volumes at 13th Avenue. As shown in the traffic study, the Project is not anticipated to have any eastbound left-turns at Driveway 2 in light of the fact that 15th Street is not a through street to the west (terminates just west of Fernando Avenue). Project traffic is anticipated to utilize Monte Verde Avenue to access the local roadway network from the site. As such, there is nominal conflict anticipated between these back-to-back left turns between Driveway 2 and 13th Avenue. Attachment B includes a copy of a traffic count collected at 13th Avenue and 15th Street.

**COMMENT #9**

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

Table 2-3 does not match Appendix 1.1

**RESPONSE #9**

See Response #4.

**COMMENT #10**

2.4.3 SAN BERNARDINO COUNTY CMP

Document references intersection of Etiwanda Avenue & Baseline Road in error.

**RESPONSE #10**

Text has been revised to correctly reference the intersection of Grove Avenue and Foothill Boulevard as the CMP intersection.

**COMMENT #11**

3.1 EXISTING CIRCULATION SYSTEM

Text references seven (7) study intersections; does not match Appendix 1.1

**RESPONSE #11**

See Response #4.

**COMMENT #12**

Exhibit 3-1 does not match Appendix 1.1

**RESPONSE #12**

See Response #4.

**COMMENT #13**

3.5 EXISTING (2018) TRAFFIC COUNTS

Local School Traffic added per subsequent discussion and Appendices

a. Shown in Appendices 3 Graphics & Tables

**RESPONSE #13**

No response necessary.

**COMMENT #14**

Exhibit 3-10 does not match Appendix 1.1

**RESPONSE #14**

See Response #4.

**COMMENT #15**

Exhibit 3-11 does not match Appendix 1.1

**RESPONSE #15**

See Response #4.

## COMMENT #16

Exhibit 3-12 does not match Appendix 1.1

## RESPONSE #16

See Response #4.

## COMMENT #17

Additionally, the School Only Traffic Volumes appear to have discrepancies as follows:

a. Foothill High School graphic is missing from Appendix 3

   i. Instead there are (2) Foothill Knolls

   ii. These schools have significant trip generation differences; are they accounted for properly in overall analysis?

## RESPONSE #17

There is no Foothill High School in the Upland Unified School District. The only 2 high schools are Upland High School and Hillside High School. As shown on the trip generation, the following schools were included (with traffic distributed according to the referenced exhibit):

- Sierra Vista Elementary School – see Exhibit 3.2-1
- Foothill Knolls (K-8) – see Exhibit 3.2-2
- Valle Vista Elementary School – see Exhibit 3.2-3
- Upland Junior High School – see Exhibit 3.2-4
- Upland High School – see Exhibit 3.2-5
- Alta Loma High School – see Exhibit 3.2-6

Foothill Knolls was not duplicated in the forecasting. The trip generation is driven by type of school (elementary, junior high, or high school) and the number of students. The trip distribution is based on school district boundaries for each school and the areas that each school serves.

## COMMENT #18

b. Foothill High School is listed in Table 3-2-1

   i. No Graphic

## RESPONSE #18

There is no Foothill High School in the Upland Unified School District. The only 2 high schools are Upland High School and Hillside High School.

## COMMENT #19

Exhibit 3-13 does not match Appendix 1.1

a. Is Foothill High School volume correct?

## RESPONSE #19

See Response #4 and Response #18. The trip assignment of the schools is shown on Exhibit 3-12, which are based on the trip generation and trip distribution patterns provided in Appendix 3.2. Volumes shown on Exhibit 3-13 include existing baseline traffic counts and the school volumes shown previously on Exhibit 3-12. This is also discussed in the report text in the last paragraph of Section 3.5 of the traffic study.

## COMMENT #20

Exhibit 3-14 does not match Appendix 1.1

a. Is the Summary correct?

## RESPONSE #20

Yes, the summary of level of service peak hour operations is correct based on the forecasts, traffic controls, and lane geometrics identified in Chapter 3 of the traffic study.

## COMMENT #21

Table 3-1 does not match Appendix 1.1

## RESPONSE #21

See Response #4.

**COMMENT #22**

4 PROJECTED FUTURE TRAFFIC

Text does not match Appendix 1.1

**RESPONSE #22**

See Response #1.

**COMMENT #23**

Table 4-1 does not match Appendix 1.1

**RESPONSE #23**

See Response #1.

**COMMENT #24**

Exhibit 4-1 does not match Appendix 1.1

**RESPONSE #24**

The trip distribution from the scoping agreement was expanded to include the two intersections added by City staff during the scoping process (see Appendix 1.1).

**COMMENT #25**

Exhibit 4-2 does not match Appendix 1.1

**RESPONSE #25**

Exhibit 4-2 was not included in the scoping agreement.

**COMMENT #26**

5 E+P TRAFFIC CONDITIONS

Exhibits & Tables do not match Appendix 1.1

**RESPONSE #26**

See Response #1 and Response #4.

## COMMENT #27

6 OPENING YEAR CUMULATIVE (2020) TRAFFIC ANALYSIS

Exhibits & Tables do not match Appendix 1.1

## RESPONSE #27

See Response #1 and Response #4.

## COMMENT #28

7 HORIZON YEAR (2040) TRAFFIC ANALYSIS

Exhibits & Tables do not match Appendix 1.1

## RESPONSE #28

See Response #1 and Response #4.

## COMMENT #29

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Text references that under E + P traffic conditions, there were noted previous warranted locations

a. It appears that Section 5.2 (page 45) is not consistent with this statement.

## RESPONSE #29

Section 5.4 identifies that there are no study area intersections warranting a traffic signal for E+P traffic conditions.

## COMMENT #30

b. Please clarify.

## RESPONSE #30

The phrase “in addition to those previously warranted for E+P traffic conditions” has been removed from Section 6.5 and 7.5 of the revised traffic study. There were no intersections warranted under E+P or any other future traffic analysis scenarios.

If you have any questions, please contact me directly at (949) 336-5982.

Respectfully submitted,
URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Associate Principal

# ATTACHMENT A
# CITY OF UPLAND COMMENTS, DECEMBER 31, 2018

# Traffic Impact Analysis

Engineers/Surveyors

2305 Chicago Avenue
Riverside, California 92507
(951) 680-0440 Fax (951) 680-0490

| | |
|---|---|
| **SUBMITTAL NO.** 1 | DATE: 12/31/2018 |
| **PROJECT NO:** | Traffic Impact Analysis: Upland Colonies; Dated August 23, 2018 |
| | VILLA SERENA ( @ 15th Street) |
| **LOCATION** | N/O 15th St & W/O Alta Ave |
| **SUBJECT** | Traffic Impact Analysis report; 1st PC |

TO: City of Upland: Ponce Yambot
Urban Crossroads

Cc: Mike Thornton

FROM: Monae Pugh
Traffic Engineering

The following Comments are being offered for the Traffic Impact Analysis (TIA) dated August 23, 2018:

On behalf of the City of Upland, TKE Engineering has completed the first (1st) review of the Traffic Impact Analysis (TIA) for the Project known as Upland Colonies.

**Project Background**
The proposed project consists of the development of 66 single family detached residential dwelling units. The project is anticipated to be developed in a single phase with an opening year of 2020.

The project is anticipated to generate a net total of 623 trip-ends with 50 A.M. & 65 P.M. peak hour trips.

**Methodology**
The report methodology is generally consistent with San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports.

However, the Scoping Agreement approved 7/10/18, and as attached to the report in Appendix 1:1 does not align with the document.

**Scoping**
The Scoping Agreement, as attached to report Appendices, generally differs as follows:

- 85 Single Family Detached Units
  - Project Trip Generation Summary
- Site Plan
  - Two Access Driveways on 15th Street
  - Neither location aligns with 13th Street
- Study Intersections

As such, the following comments are listed and referenced for reconciliation and updating. Please note that every effort was made to include all discrepancies however a thorough update to the document is required.

Additionally, a current & approved Site Plan is required with the Traffic Analysis submittal.

**Specific Report Comments:**

**1 INTRODUCTION**
**1.1 Project Overview**

1 • Unit count, trip generation and site access driveways are not consistent with Appendix 1.1
2 • Exhibit 1-1 Preliminary Site Plan does not match Appendix 1:1

**1.2 Study Intersections**

3 • Eleven (11) are noted in text, seven (7) are shown in Table 1-1
4 • Table 1-1 does not match Appendix 1:1
5 • Exhibit 1:2 does not match Appendix 1:1
6 • Exhibit 1-3 does not match Appendix 1:1
7 • Exhibit 1-4 does not match Appendix 1:1

**1.7 On-Site Roadway and Site Access Improvements**

8 • Site access does not match the Scoping Agreement which aligns one (1) driveway with 13th Street

**2 METHODOLOGIES**
**2.3 Traffic Signal Warrant Analysis Methodology**

9 • Table 2-3 does not match Appendix 1:1

**2.4.3 San Bernardino County CMP**

10 • Document references intersection of Etiwanda Avenue & Baseline Road in error.

**3 AREA CONDITIONS**
**3.1 Existing Circulation System**

11 • Text references seven (7) study intersections; does not match Appendix 1:1
12 • Exhibit 3-1 does not match Appendix 1:1

**3.5 Existing (2018) Traffic Counts**

13 • Local School Traffic added per subsequent discussion and Appendices
  - Shown in Appendices 3 Graphics & Tables

14 • Exhibit 3-10 does not match Appendix 1:1
15 • Exhibit 3-11 does not match Appendix 1:1
16 • Exhibit 3-12 does not match Appendix 1:1

Additionally, the School Only Traffic Volumes appear to have discrepancies as follows:

17
- Foothill High School graphic is missing from Appendix 3
  - Instead there are (2) Foothill Knolls
  - These schools have significant trip generation differences; are they accounted for properly in overall analysis?

18
- Foothill High School is listed in Table 3-2-1
  - No Graphic

19 • Exhibit 3-13 does not match Appendix 1-1
- Is Foothill High School volume correct?

20 • Exhibit 3-14 does not match Appendix 1-1
- Is the Summary correct?

21 • Table 3-1 does not match Appendix 1:1

**4 PROJECTED FUTURE TRAFFIC**

21 • Text does not match Appendix 1:1
23 • Table 4-1 does not match Appendix 1:1
24 • Exhibit 4:1 does not match Appendix 1:1
25 • Exhibit 4:2 does not match Appendix 1:1

**5 E+P TRAFFIC CONDITIONS**

26 • Exhibits & Tables do not match Appendix 1:1

**6 OPENING YEAR CUMLATIVE (2020) TRAFFIC ANALYSIS**

27 • Exhibits & Tables do not match Appendix 1:1

**7 HORIZON YEAR (2040) TRAFFIC ANALYSIS**

28 • Exhibits & Tables do not match Appendix 1:1

**7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS**

Text references that under E + P traffic conditions, there were noted previous warranted locations
29 • It appears that Section 5.2 (page 45) is not consistent with this statement.
30 • Please clarify.

Please include a written response to comments as some items may require clarification or verification without actual modification to the report.

The report should be re-submitted in its entirety.

Thank you for your submittal. Diligent effort is made to provide comprehensive comments. The City reserves the right to include additional comments as deemed necessary and appropriate throughout the review process.

# ATTACHMENT B
# TRAFFIC COUNTS

# INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jul 17, 18

LOCATION: Upland
NORTH & SOUTH: 13th
EAST & WEST: 15th

PROJECT #: SC
LOCATION #: 2
CONTROL: STOP N

NOTES:

AM
PM
MD
OTHER
OTHER

◄ W
N ▲
S ▼
E ►

Add U-Turns to Left Turns

| | NORTHBOUND 13th | | | SOUTHBOUND 13th | | | EASTBOUND 15th | | | WESTBOUND 15th | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LANES: | NL 0 | NT X | NR 0 | SL X | ST X | SR X | EL X | ET 1 | ER 0 | WL 0 | WT 1 | WR X | TOTAL |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| 8:30 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| VOLUMES | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 7 |
| APPROACH % | 50% | 0% | 50% | 0% | 0% | 0% | 0% | 0% | 0% | 60% | 40% | 0% | |
| PEAK HR FACTOR | | 0.500 | | | 0.000 | | | 0.000 | | | 0.417 | | 0.583 |
| APP/DEPART | 2 | / | 0 | 0 | / | 3 | 0 | / | 2 | 5 | / | 2 | 0 |
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| 3:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 |
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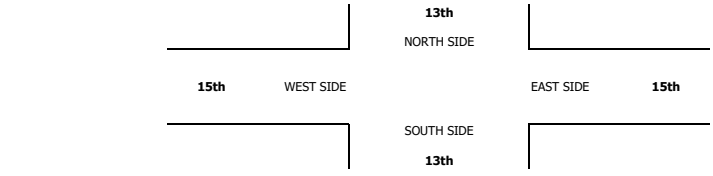


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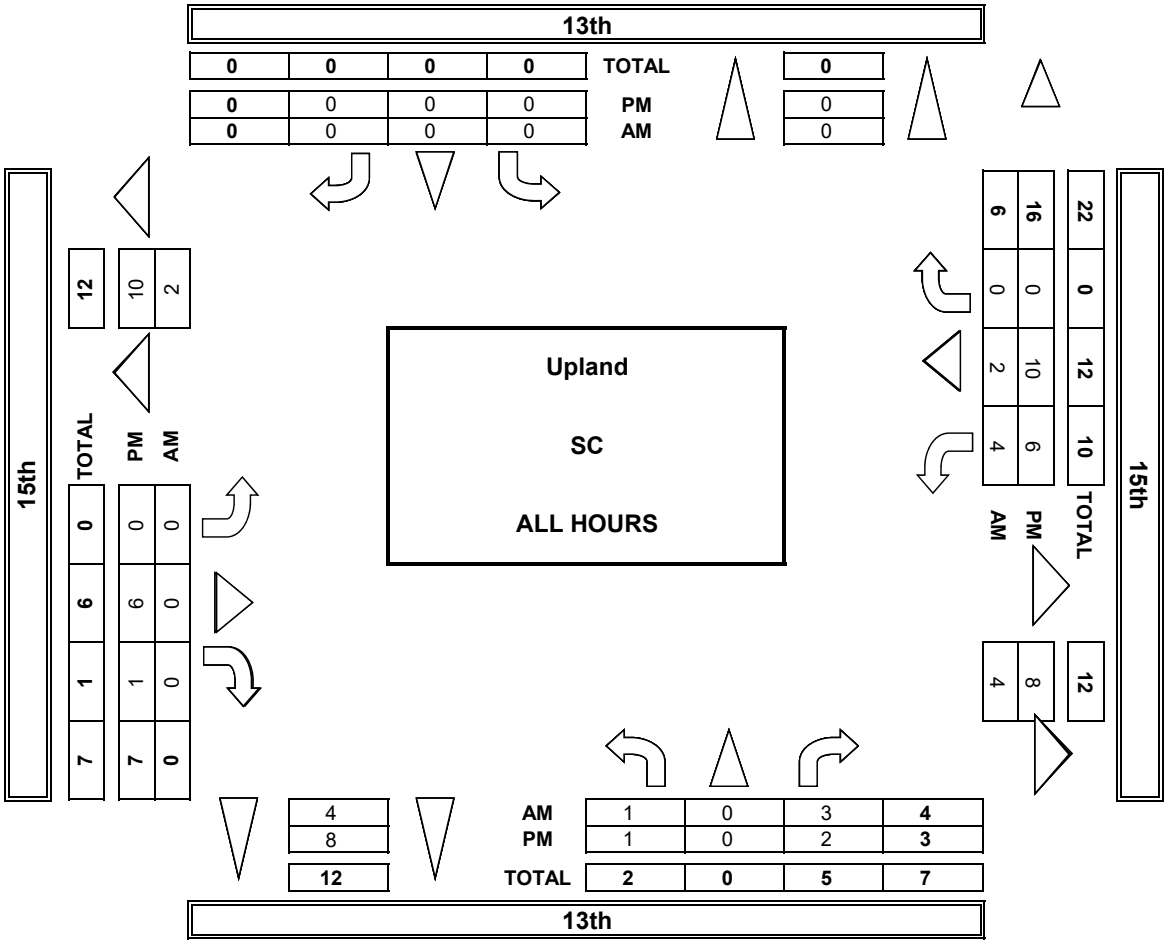
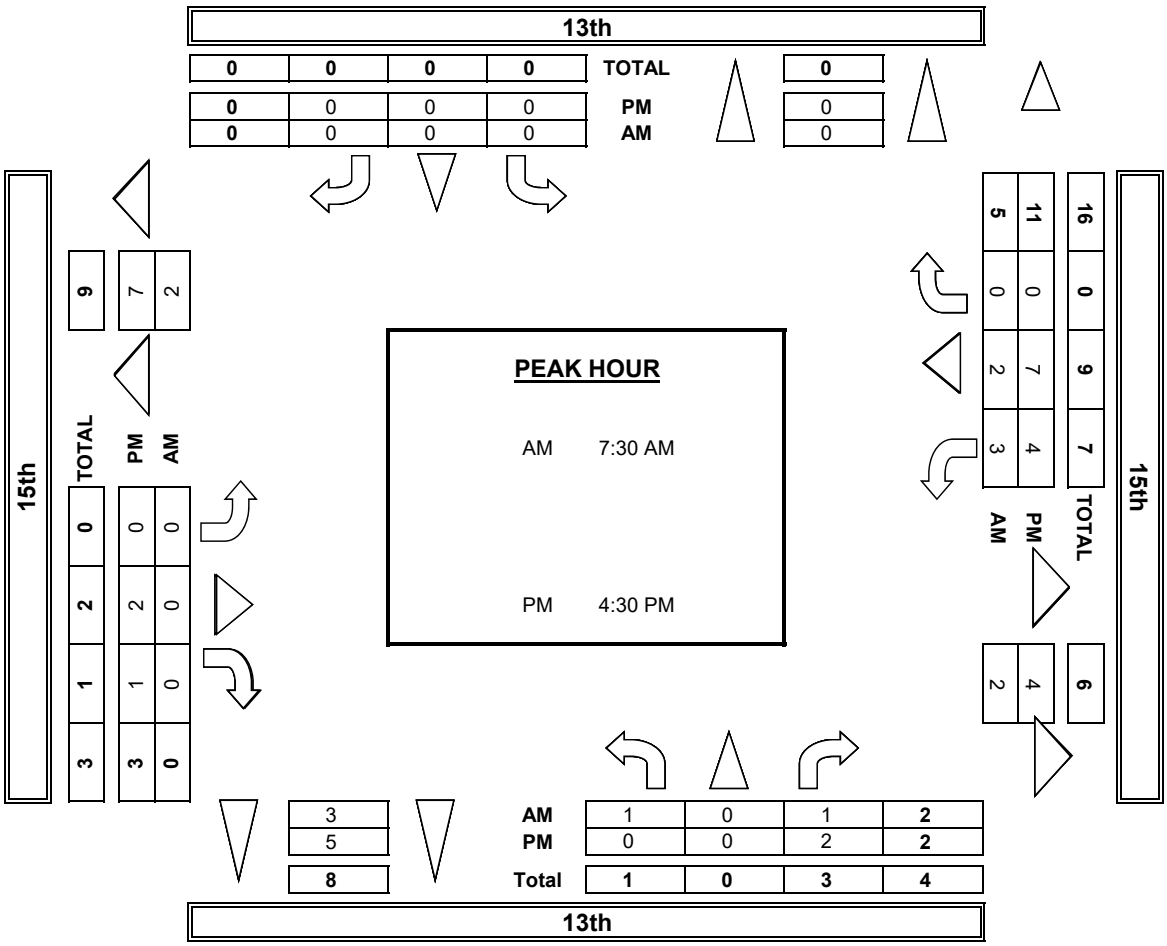
**AimTD LLC**

TURNING MOVEMENT COUNTS



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# APPENDIX B

# VILLA SERENA SPECIFIC PLAN

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# Villa Serena Specific Plan

CITY OF UPLAND | DRAFT JUNE 2024

# Villa Serena Specific Plan

DRAFT

June 2024

**Applicant:**

The Colonies Partners, L.P.

**Consultants:**

Architerra Design Group

Deborah Linn Planning Consultant

KB Home

Madole & Associates, Inc.

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# Section 1. Introduction

## 1.1 Project Overview

The Villa Serena Specific Plan (Specific Plan) is a proposal by The Colonies Partners, L.P. (Applicant) to develop a gated residential community on approximately 9.16 gross acres owned by the applicant (Project Site) and to improve approximately .78 additional acres off-site adjacent to the Project Site for open space and circulation purposes in the City of Upland. The Project Site is generally located north of 15th Street and east of North Campus Avenue as illustrated in Exhibit 1, "Regional Context Map" and as further described in the "Project Vicinity Map," Exhibit 2.

The Project Site is an infill site with single family residential uses adjacent to the Project Site on the south, west, and southeast, and the Upland Hills Country Club and residential community adjacent to the Project Site to the north. An existing flood control basin is located adjacent to the Project Site to the east. A Southern California Edison substation is located in proximity to the Project Site on the northwest. A recreational vehicle storage yard is located to the southwest of the Project Site. The Specific Plan is a comprehensive plan for development of 65 single family detached residential units at a density of 7.10 dwelling units per acre and on-site active and passive recreational amenities within common open space areas. The Specific Plan also includes a plan for the extension of existing 15th Street improvements from the Project Site westerly to the terminus of East 15th Street providing a private access roadway and entry to the Project as well as construction of off-site public open space improvements.

The new community planned as part of the Specific Plan incorporates the traditional housing styles of Upland, California, while also reflecting the architecture of recently built neighborhoods. The architectural styles of the Specific Plan are influenced and inspired by Spanish, Italianate, and French Country that echo the classic architecture of the Southern Californian regions. The Specific Plan integrates styles, elements, and a mix of materials from both established and newer residential communities located near the Project Site. The use of Spanish roof tiles, gable end details, and delicate metal rails reflects the classic Spanish style of the historical Upland communities. Similarly, the vertical corner details, symmetry, and arched openings of the Italianate style, and the corbels, stone siding, and steep roof pitches of the French Country architectural style, capture the details of the past and present styles of Upland homes. The new homes planned within the Project Site are designed to reflect the massing and scale of existing neighboring homes by using similar proportions, heights, and footprints allowing for the new community to comfortably blend with the existing neighborhood and the community at large.

Construction of new Project roadways and infrastructure is planned to connect to existing facilities located adjacent to the Project Site. The proposed plan reduces the need for construction of additional arterial and major roadway improvements to serve the Project Site.

The proximity of the Project Site within walking and biking distance to existing recreational and commercial facilities can help to reduce automobile trips to and from the Project Site. The Project provides pedestrian and bicycle connectivity to a nearby Sierra Vista Park, located approximately .5 miles southwest of the Project Site to Upland Memorial Park located approximately .8 miles south of the Project Site and to the existing public trail located along the rim of a flood control basin located adjacent to the Project Site on the east. Commercial services within biking distance from the Project Site are located within one mile of the Project Site at the Colonies Crossroads Center located at North Campus Avenue and 19th Street. This regional

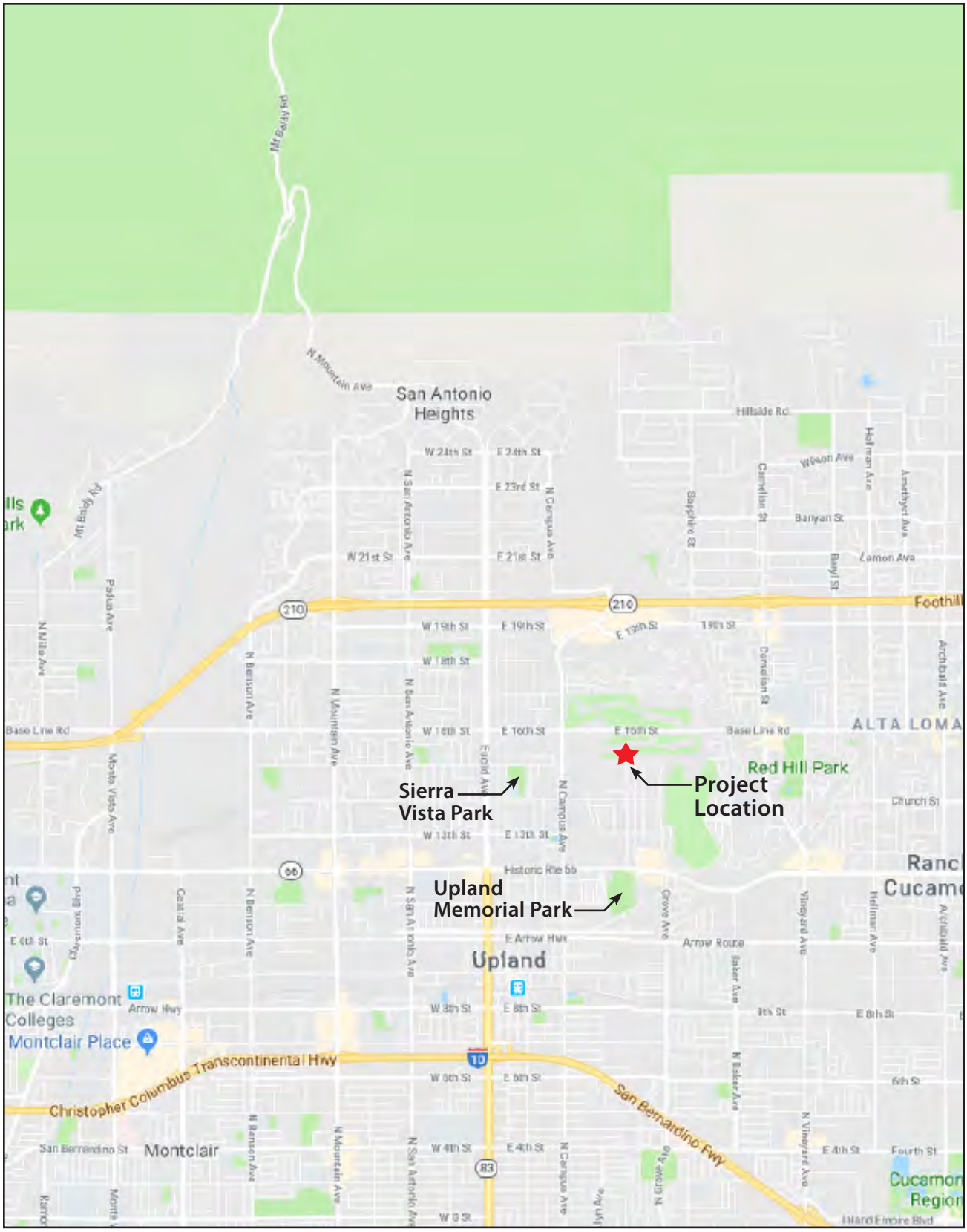


Exhibit 1

**Regional Context Map**

*Source: Google Maps*

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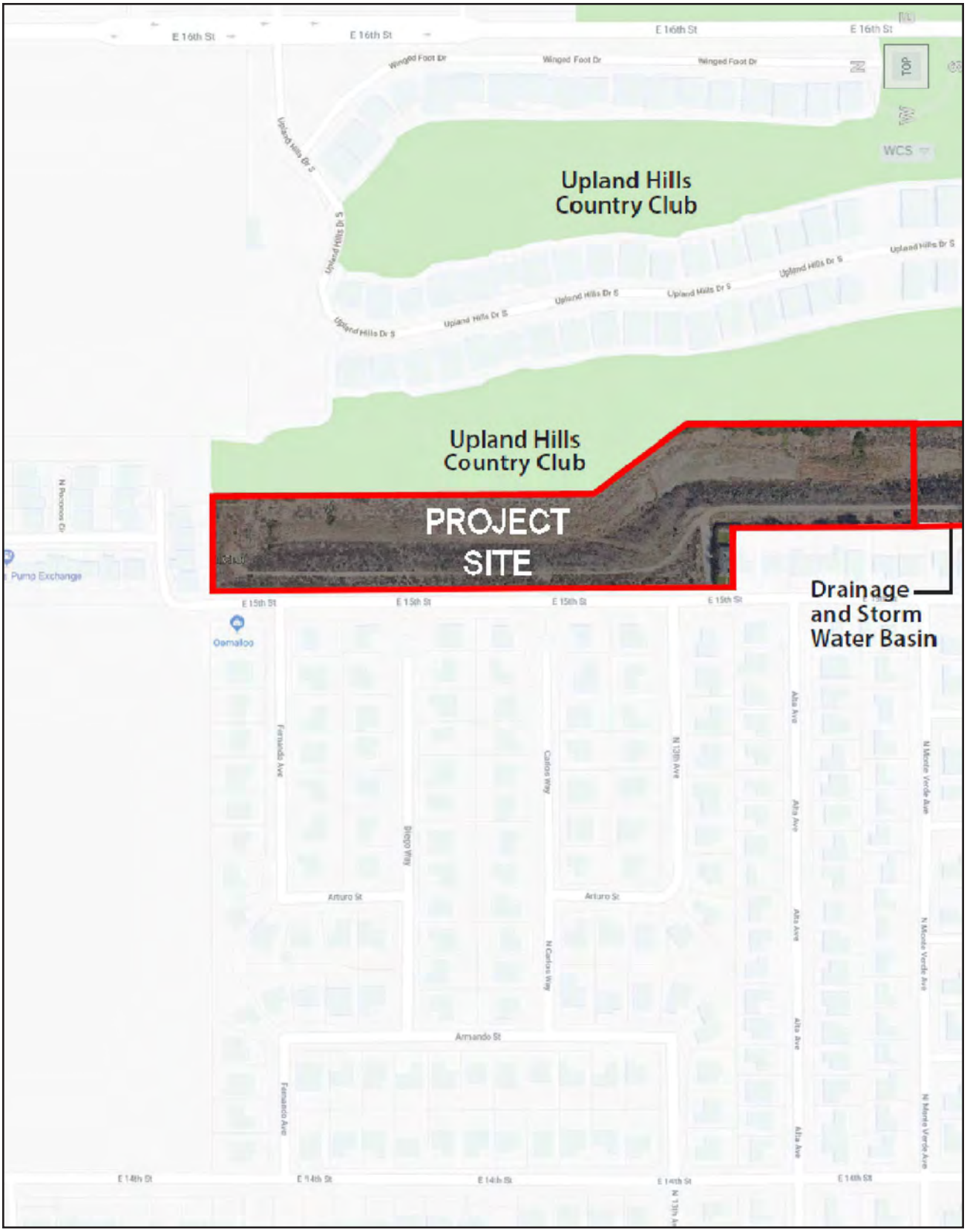


Exhibit 2
**Project Vicinity Map**

*Source: Madole & Associates, Inc./Google Maps*

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commercial center offers residents a supermarket, restaurants, personal services, entertainment, and home goods for residents in the vicinity.

The Specific Plan is designed to create a distinctive sense of place for residents in a gated community with a pedestrian and bicycle friendly street system creating an atmosphere where neighbors can visit with one another while walking throughout the community. Common area open space within the community offers active and passive recreational amenities for residents and a community gathering place for residents. Homes are planned to front onto streets, enabling residents to have their "eyes on the street," promoting a safe hometown feel and encouraging interaction among neighbors.

## 1.2 Project Setting

The physical setting of the Project Site is illustrated on Exhibit 3, "Project Setting." The Project Site comprises a portion of an approximately 20 acre flood control detention basin. The City of Upland has determined a 9.16 acre portion of the flood control detention basin, comprising the Project Site, to be a surplus parcel suitable for development of residential uses with the remaining approximately 11 acres of the flood control detention basin to be adequate for continued flood control operations pursuant to completion of modifications to portions of the basin as part of the Project. As part of the Project, access for flood control detention basin maintenance vehicles is provided through the Project Site with a gated entry to the basin located at the easterly edge of the Project boundary.

## 1.3 Purpose and Authority

### 1.3.1 Purpose

The Villa Serena Specific Plan implements a General Plan Amendment changing the General Plan Land Use Map for the Project Site from Public Flood Control/Recharge (FC/R) to Villa Serena Specific Plan (SP), allowing residential land use development at a density of 7.10 dwelling units per acre consistent with surrounding residential single family low (SFR-L) and single family medium (SFR-M) development located adjacent to the Project Site. Adoption by the City of the Specific Plan by ordinance changes the City's Zoning Map for the Project Site from Public (PB-FC) to "Villa Serena Specific Plan." The adoption of the Villa Serena Specific Plan (Specific Plan) implements the General Plan land use designation of SP through the establishment of site specific zoning regulations for the development of the Project Site.

The Specific Plan is a comprehensive plan for development of residential and open space land uses and infrastructure improvements to serve the development. The Specific Plan establishes the development regulations and design criteria for development of the Project. The Specific Plan also establishes the procedures and requirements enabling City review and approval of development the Project thereby ensuring that the City's General Plan, as amended for the Project Site, is implemented.




Exhibit 3
**Project Setting**

*Source: Madole & Associates, Inc./Google Maps*

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### 1.3.2 Authority of the Specific Plan

State of California Government Code, Title 7, Division 1, Chapter 3, Article 8, Section 65450-57, grants authority to cities to adopt specific plans for purposes of implementing the goals and policies of their general plans. The Government Code specifies that specific plans may be adopted either by resolution or by ordinance and that the specific plan must be consistent with the general plan. The Government Code sets forth the minimum requirements and review procedures for specific plans including provision of a land use plan, an infrastructure and public services plan, criteria and standards for development, and implementation measures. The Government Code also states that specific plans may address any other subjects which, in the judgment of the city, are necessary or desirable for implementation of the general plan.

## 1.4 Objectives

The Specific Plan addresses the following planning and design objectives to ensure that development of the Project Site is consistent with the City's General Plan, as amended, and serves as a foundation for the design of a residential community which provides a sense of place for residents and responds to the existing surrounding built environment. Consistency of the Project with the General Plan is discussed in Section 6,"General Plan Consistency," of the Specific Plan.

***Objective 1:***

Foster a sense of community and promote a unified and cohesive neighborhood environment through the following design measures:

- Create a distinctive community design with a well designed entry, streetscapes, walls, and entry monument.
- Provide for architectural diversity within the community with varying residential floor plans and architectural styles.
- Create a strong sense of arrival into the Project Site through an enhanced community entry.
- Provide for on-site recreational opportunities for residents through provision of common area open space within the community offering active and passive recreational amenities for all age groups.
- Provide for public off-site recreational opportunities through the development of passive open space.

***Objective 2:***

Design a development plan which ensures the community is adequately served by public facilities, infrastructure, and utilities without the need for extensions or improvements to existing public facilities through the following measures:

- Provide for a simple two way private street system connecting to an existing public arterial roadway, and minimize points of access to existing roadways.
- Provide for a pedestrian and bicycle friendly circulation system providing connectivity within the community and connecting to 15th Street where pedestrians and bicyclists can access existing public streets, trails, and sidewalks.
- Provide for adequate storm water collection within the Project Site to contain on-site and off-site flows affecting the property.
- Provide for adequate wastewater facilities on-site and ensure that adequate capacity is available within existing public sewer facilities to serve the Project Site.
- Provide on-site facilities for water quality treatment and ground water replenishment.
- Participate in payment of appropriate Development Impact Fees to accommodate the public service needs generated by the community.

***Objective 3:***

Incorporate the following green and sustainable design features into the development plan.

- Design homes with opportunities for remote working allowing people to work from home reducing driving time and vehicle emissions.
- Incorporate native plant materials and/or drought tolerant plant materials within the landscaping of public spaces, and encourage homeowners to utilize drought tolerant plant materials in private yard areas.
- Design homes with currently available technology for internet access allowing residents to shop and work on-line, helping to reduce vehicle trips to employment centers and shopping.
- Incorporate passive solar design and energy efficient construction materials and techniques into residential design such as cool roofs, dual pane windows, increased insulation to minimize heat transfer and thermal bridging, and roofs designed to accommodate homeowner installation of solar panels to help reduce energy demand.
- Implement "dark sky friendly" outdoor lighting within streets and common area open space.
- Provide for a plant palette which includes canopy trees to achieve natural ventilation and cooling and use of water conserving landscape plant materials and irrigation systems.
- Provide for a landscape and irrigation plan consistent with Upland Municipal Code Chapter 17.12 (Landscaping) and the State Model Water Efficient Landscape Ordinance (23 C.C.R § 490 et seq.)

## 1.5 Project Summary

The Specific Plan is a comprehensive plan for the development of up to 65 single family detached residential dwelling units designed around a private two way street system with pedestrian walkways linking residences to on-site common area open space and to existing adjacent roadways connecting to existing nearby recreational amenities and commercial services. The Project street system provides walking and biking connectivity from the Project Site to 15th Street enabling residents to walk or bike to the nearby Sierra Vista Park located approximately .5 miles southwest of the Project Site, Upland Memorial Park located approximately .8 miles south of the Project Site and the Colonies Crossroads commercial center located north of the Project Site.

### 1.5.1 Residential

Sixty five single family detached residential dwellings are planned at a density of 7.10 dwelling units per acre designed in a variety of styles and floor plans. The Project incorporates three distinctive architectural styles for homes influenced and inspired by Spanish, Italianate, and French Country architecture as depicted in Section 4.6 "Architectural Design." Private streets within the Project provide access to residential dwellings. All residential dwellings are planned as street fronting units.

### 1.5.2 Open Space

The Project includes provision of approximately 1.02 acres of private on-site common area open space distributed throughout the community. On-site common area open space includes a .23 acre recreational area to include a swimming pool, a pool house with restrooms, and barbeque and picnic areas. Five individual pocket parks totaling .79 acres are planned for passive recreational use by residents. Pocket parks will include shady landscaped areas with benches, picnic tables, a putting green, children's

play areas, and a trail connecting the community to the existing basin trail adjacent to the Project Site.

Off-site public open space improvements include a .15 acre park adjacent to the Project Site accessible from 15th Street.

### 1.5.3 Pedestrian and Bicycle Connectivity

The Project includes a private two way street system with sidewalks on both sides of the street providing pedestrian connectivity as well as bicycle accessibility throughout the Project. The connection of the Project street and walkway system to 15th Street provides for on-street bicycle and pedestrian connectivity within the community and connectivity to commercial services located at North Campus Avenue and 19th Street, approximately one mile to the north of the Project Site, and to Sierra Vista Park, approximately .5 miles southwest of the Project Site and Upland Memorial Park located approximately .8 miles south of the Project Site. Private pedestrian and bicycle connectivity through the community to open space is provided through the on-site street system and a private pocket park trail extending through the Project connecting to the existing adjacent public basin trail. Public bicycle and pedestrian access to the off-site basin trail is provided within a separate trail extending from 15th Street to the public basin trail.

### 1.5.4 Infrastructure

The Specific Plan proposes new on-site roadways, water mains, sewer mains, and drainage facilities designed to connect to 15th Street and existing public facilities located within 15th Street. As part of the Project, an unimproved portion of 15th Street right of way between Fernando Avenue and the terminus of East 15th Street to the west will be completed providing access to the residential component of the Project. Expansion of existing infrastructure facilities is not necessary to serve the Project. As part of the Project, site improvements, as described in Section 2, "Development Plan," will be made to the entire Upland Basin flood control and detention basin to create the Project Site suitable for residential development and to ensure the downstream flows to the basin are not impacted.

## 1.6 Governing Documents

The adoption of the Specific Plan is the first step in a process leading to the development of the Project. The development of the Project is governed by the following documents.

### 1.6.1 General Plan

California Government Code (Title 7, Division 1, Chapter 3, Article 8, Section 65450-65457, permits the adoption and administration of a specific plan as an implementation tool for elements contained in the local general plan. Specific plans must demonstrate consistency in regulations, guidelines, and programs with the goals and policies set forth in the general plan. In September 2015 the City adopted the "City of Upland General Plan" which sets forth the following topics to address the state mandated general plan elements:

- Land Use
- Circulation
- Housing
- Open Space and Conservation
- Safety (which includes the state mandated Noise Element)

In addition to the state mandated elements, the City of Upland General Plan includes the following elements:

- Focus Areas
- Community Character and Urban Design
- Economic Sustainability
- Healthy Community

The Villa Serena Specific Plan implements a General Plan Amendment changing the General Plan Land Use Map for the Project Site from Public Flood Control/Recharge (FC/R) to Villa Serena Specific Plan (SP) allowing residential land use development at a density of 7.10 dwelling units per acre. The Specific Plan is consistent with applicable goals, objectives, and policies of the Upland General Plan, as amended, pertaining to the planned development as described in Section 6, "General Plan Consistency."

### 1.6.2 Specific Plan

The Specific Plan serves as the legal document to implement the General Plan land use designation for the Project Site of Villa Serena Specific Plan (SP) and provides the zoning for development of the Project Site as a residential community at a density of 7.10 dwelling units per acre. The Specific Plan establishes land use and development regulations designed to govern development of the Project. In instances where the Specific Plan is silent, regarding a specific development standard or procedure for implementing the Specific Plan, the Upland Municipal Code Zoning Code Title 17, (Planning and Zoning) shall prevail. The Specific Plan provides a "blueprint" for development of the Project establishing permitted uses, a land use plan, the development requirements, and design criteria for land development as set forth herein.

### 1.6.3 Subdivision Maps

Approval of a tentative and final tract map is required for the development of the Project. The subdivision map for the Project shall be prepared pursuant to the applicable provisions of the State of California Subdivision Map Act (Government Code Section 66410 through 66499), the City of Upland Municipal Code, Title 16, "Subdivisions," and consistent with the applicable provisions of the Specific Plan.

### 1.6.4 Development Plan Review

Applicable provisions of Upland Municipal Code, Title 17, (Planning and Zoning) Section 17.44.030 (Development Plan Review) shall apply to the review and approval of the site development plans for the proposed Project.

### 1.6.5 Covenants, Conditions, and Restrictions

Covenants, Conditions, and Restrictions (CC&Rs) approved by the City serve to ensure and enforce quality design of the Project over the long term and the continued uniform maintenance of streets, common areas, and street and common area landscaping.

## 1.7 CEQA Compliance

An Environmental Impact Report (EIR) prepared by the City of Upland for the Project in accordance with the California Environmental Quality Act (CEQA) and City requirements considers the potential environmental impacts of all Project related activities and the discretionary and ministerial applications associated with implementation of the Project. The EIR includes mitigation measures and a Mitigation Monitoring and Reporting Program (MMRP) in order to ensure that any potential significant impacts of the Project on the environment be reduced to a less than significant level.

## 1.8 Specific Plan Components

The Specific Plan is organized into the following sections in addition to Section 1, "Introduction."

***Section 2 - Development Plan***

This section describes the physical setting for the Project Site outlining the existing physical conditions found within and surrounding the Project Site, the Project land use plan describing residential and open space land use areas of the Project, and the on- site and off site infrastructure and open space improvements as part of the the Project.

### *Section 3 - Development Regulations*

This section establishes the allowable land use within the Project Site and standards and requirements for development of all land uses within the Project Site.

### *Section 4 - Design Criteria*

The Design Criteria establishes the architectural and landscape design requirements for the Project to ensure that a cohesive community of distinctive design quality, definitive architecture, and comprehensive landscaping is achieved.

### *Section 5 - Implementation*

The policies and procedures for the administration of the Specific Plan, procedures for the review and approval by the City of specific development proposals within the Project Site, Project financing, and Project maintenance responsibilities within the development are described in this section.

### *Section 6 - General Plan Consistency*

The relationship of the Specific Plan to the applicable policies of the Upland General Plan is discussed in this Section.

## Section 2. Development Plan

The Specific Plan is a proposal for development of a planned residential community within an existing urban setting on approximately 9.16 gross acres in the City of Upland. The Specific Plan also addresses the proposed development of adjacent off-site open space and circulation improvements planned as part of the Project. This section describes the land use plan and the plan for infrastructure and public services for the community.

## 2.1 Land Use

The proposed development of the Project is depicted on Exhibit 4, "Land Use Plan" and is further described in Table 2.1, "Statistical Summary." The Project is designed to respond to both on-site and off-site conditions, as well as anticipated market conditions. The Specific Plan ensures that a strong community identity is established for residents and visitors through a cohesive plan for residential and open space areas.

Table 2.1
**Statistical Summary**

| Land Use | Project Site Acres | Off-Site Development Acres |
|---|---|---|
| Residential | 5.4 | |
| Landscaped Buffer | .50 | |
| Common Area Open Space | 1.02 | .15 |
| Private Streets | 2.22 | |
| 15th Street ROW | .02 | |
| Access Roadway and Project Entry | | .63 |
| Total Gross Acres | 9.16 | .78 |
| Total Dwelling Units: 65 | | |
| Residential Density: 7.10 du/acre (65 dus ÷ 9.16 ac = 7.10 du/ac) | | |

### 2.1.1 Residential Use

Approximately 5.4 acres of the Project Site are planned for development of 65 single family detached residential dwelling units.

a. Residential Design.
Residential dwellings shall be designed to front onto private streets with floor plans designed to present an "architecture forward" image so that the residence and not the garage is the predominant view from the street. Residential design incorporates human-scale details to promote a pedestrian friendly character for the community. Such details include the use of enhanced entries, a mix of materials and textures, and authentic detailing on elements such as windows, porches, doors, and lighting.

b. Community Design.
The Specific Plan offers a strong community identity for residents and visitors through a unified approach to site design, architecture, and landscape design elements. The landscaped private street and street adjacent walkways link residences to common area open space encouraging neighborly interaction.

### 2.1.2 Open Space Use

Approximately 1.02 acres of private common area open space is provided as part of the Project to include a .23 acre recreational area with a pool, pool house with restrooms, and separate pocket park areas improved with picnic tables, barbecue facilities, exercise station, children's play area, a putting green, and five informal pocket parks totaling .79 acres. The pocket parks are located throughout the Project Site, accessible from sidewalks, and will be improved with landscaping, children's play equipment, exercise equipment and benches. One of the five on-site pocket parks is planned with a private trail providing pedestrian and bicycle connectivity for residents to the basin open space area adjacent to the Project Site on the east.

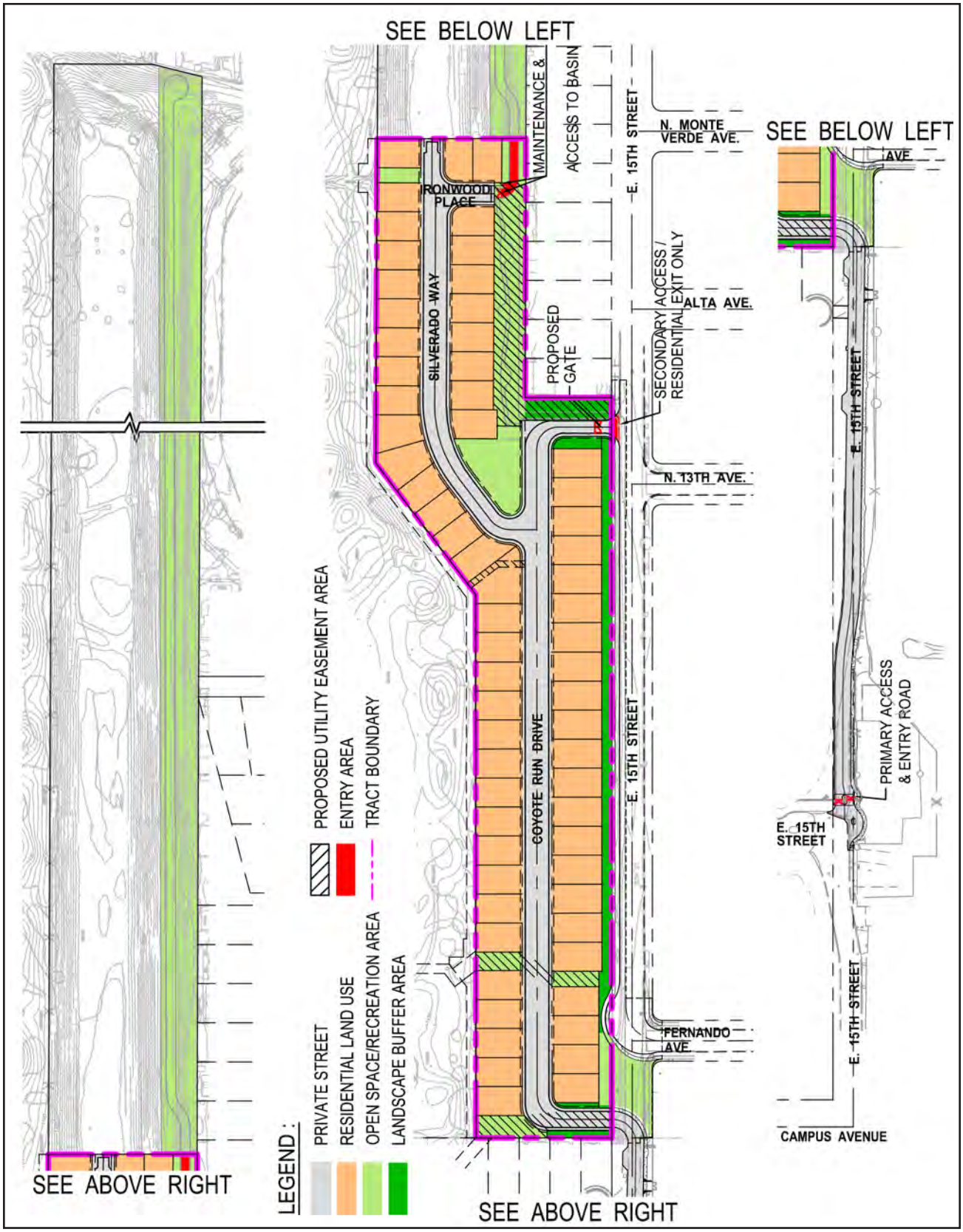



Exhibit 4
**Land Use Plan**

*Source: Madole & Associates, Inc.*

One off-site .15 acre pocket park is planned adjacent to the southern boundary of the Project Site accessible to the public from 15th Street and Fernando Avenue. This park will provide open play areas and bench seating.

## 2.2 Circulation

Access for residents to the Project Site is provided from two locations. A primary gated community entry for the Project is located west of the Project Site boundary as part of a planned off-site extension of approximately .63 acres of an unimproved portion of 15th Street. A second gated access point is provided from 15th Street at the westerly boundary of the Project Site providing exiting only for residents and emergency vehicle entry and exiting. An internal private two way street system provides primary circulation within the Project Site serving residential dwellings and the common area open space. Maintenance crews serving the remaining Upland Basin flood control and detention basin are provided vehicular access to the westerly boundary of the basin through the Project within the internal street system. A service road and gate are located at the easterly boundary of the Project Site for maintenance vehicles to access the basin. The Project provides for pedestrian and bicycle access to the existing trail located within the basin. All streets are planned as private roadways.

The circulation system serving the Specific Plan is illustrated on Exhibit 5, "Master Plan of Circulation."

### 2.2.1 15th Street

Ultimate right of way improvements for 15th Street adjacent to the Project Site include 40 feet of paved travel area with a 5 foot wide sidewalk and an 8 foot wide landscaped parkway on each side of 15th Street for a total right of way of 66 feet. As part of the Project the developer will construct an additional 8 feet of travel area, a new 5 foot sidewalk and an 8 foot wide landscaped parkway within the existing right of way adjacent to the Project Site. Primary vehicular access to and from the Project Site will be provided from an extension of 15th Street from the Project Site westerly to the terminus of East 15th Street. Improvements to this segment of 15th Street will include 26 feet of paved travel area with a retaining wall and curb on the north side of the street and a 5 foot 5 inch street adjacent sidewalk and wedge curb on the south side. The existing right of way for 15th Street and proposed project improvements for 15th Street are illustrated on Exhibits 6 and 7, "Street Cross Sections."

### 2.2.2 Project Streets

On-site Project circulation is provided by means of a private two way street with a paved travel area varying in width from 26 to 38 feet with adjacent wedge curbs. On-street parking is permitted in designated segments of the street. A 5 foot wide street adjacent sidewalk is provided on both sides of the street where homes front both sides of the street. In instances where the sides of homes are also adjacent to the street a 5 foot wide adjacent sidewalk is provided on the same side of the street. Where the centrally located common area open space fronts the street on one side and residential units front the street on the opposite side a sidewalk is provided on both sides of the street. Emergency vehicle access is provided at both project entries along 15th Street. The street improvements for the Project are illustrated on Exhibits 6 and 7, "Street Cross Sections."

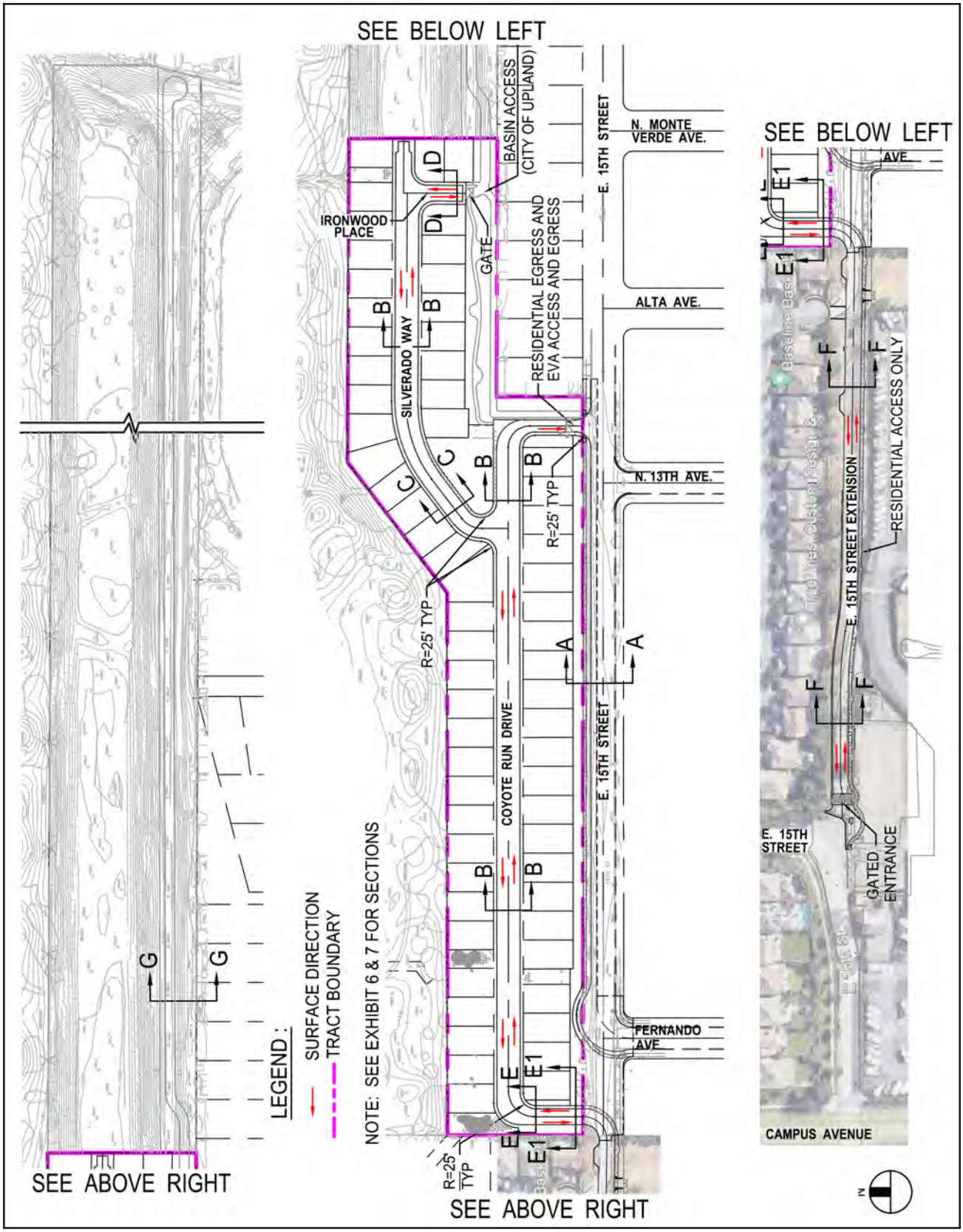
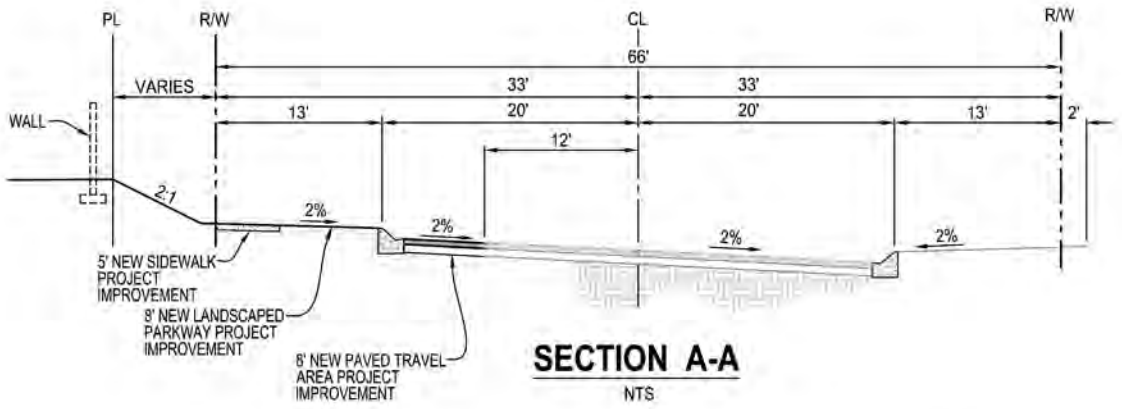
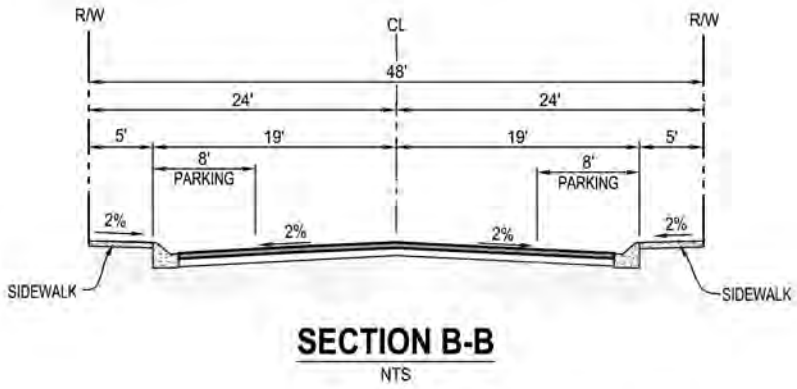


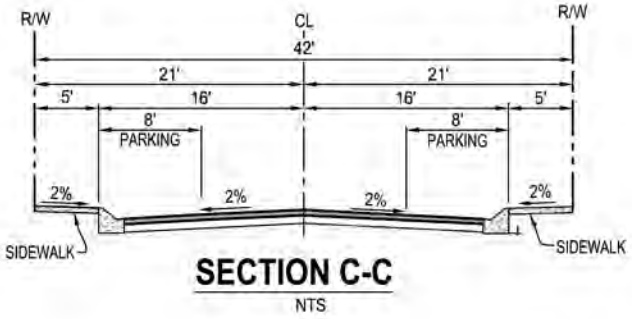

Exhibit 5

*Source: Madole & Associates, Inc.*

**Master Plan of Circulation**



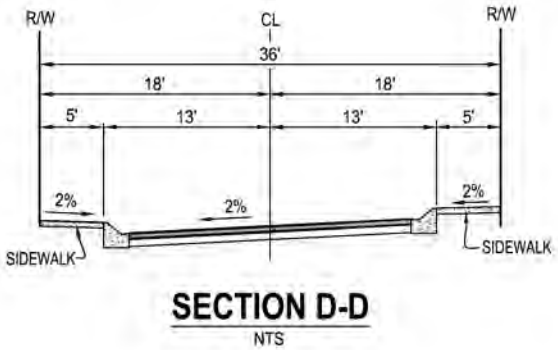




Exhibit 6

*Source: Madole & Associates, Inc.*

**Street Cross Sections**

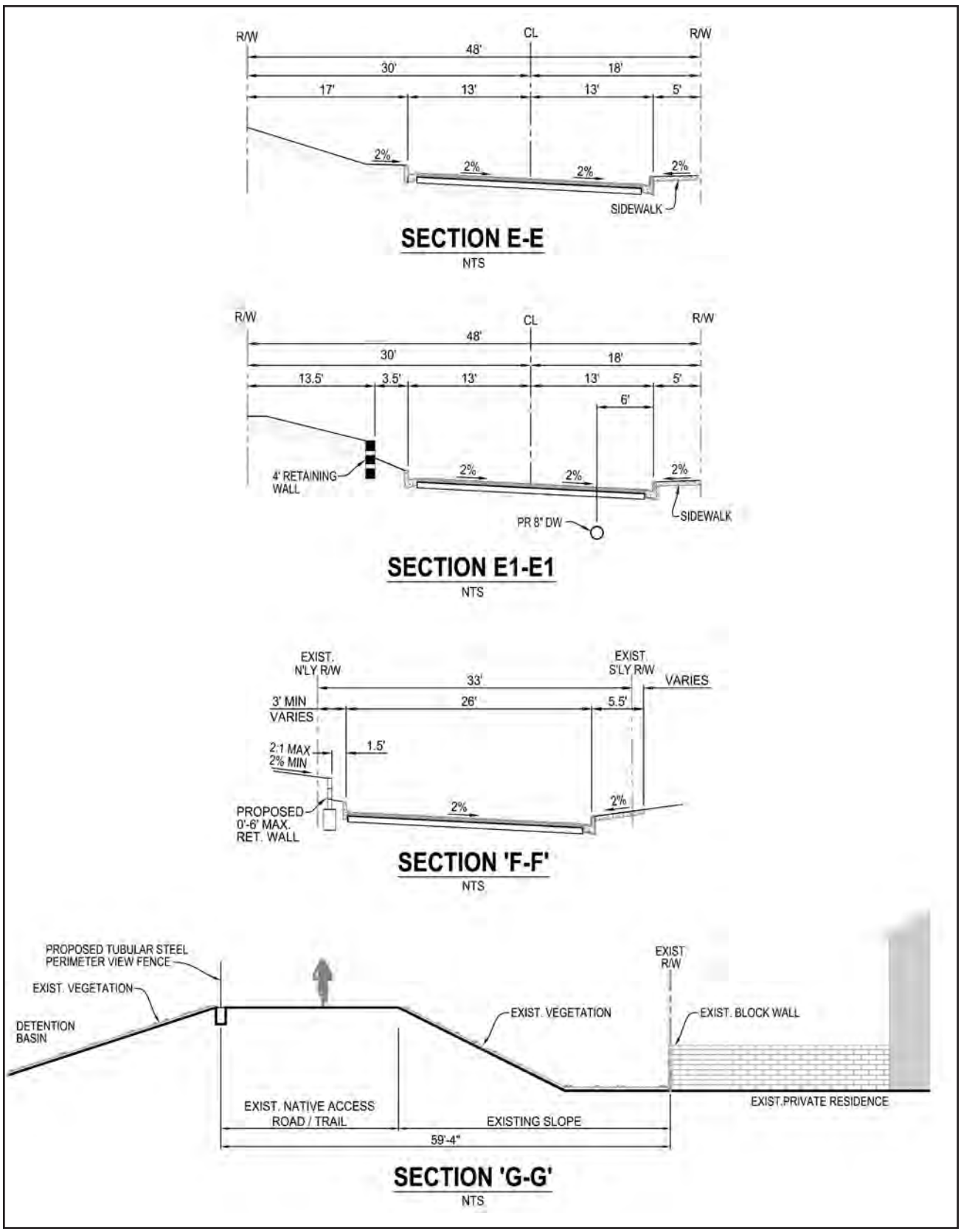



Exhibit 7

*Source: Madole & Associates, Inc.*

**Street Cross Sections**

### 2.2.3 Pedestrian and Bicycle Mobility

The Project street system includes provision of street adjacent sidewalks for pedestrian mobility within the community. The Project street system allows for on street bicycle mobility. The Project street and sidewalk system connects to 15th Street where bicyclists and pedestrians can continue on existing City streets and sidewalks to Sierra Vista Park located to the south of the Project Site and Upland Memorial Park located to the southwest of the Project Site, and to general retail commercial services located at North Campus Avenue and 19th Street, approximately one mile north of the Project Site. Connectivity is provided to the adjacent Upland Basin open space via a planned on-site private pedestrian trail and a separate public pedestrian and bicycle trail extending from Project streets and 15th Street connecting to an existing off-site public trail within the basin. The Project pedestrian and bicycle mobility plan is illustrated in Exhibit 8, "Pedestrian and Bicycle Mobility."

## 2.3 Infrastructure and Public Services

### 2.3.1 Water

The City of Upland Water Department provides water service to the City of Upland. Water service to the Project Site is provided via an existing 10 inch diameter water main located in 15th Street. The development of the Project includes construction of a network of 8 inch diameter on-site water mains adequate to provide for the domestic and fire protection water requirements of the Project. Exhibit 9, "Water Master Plan" illustrates the proposed water system to serve the Project.

### 2.3.2 Sanitary Sewer

Sewer service to the Project Site is provided by the City of Upland. Existing off-site sewer facilities available to serve the Project Site include an existing 8 inch diameter sewer main located in 15th Street adjacent to the Project Site. Development of the Project Site includes construction of an on-site network of new 8 inch sewer mains and the relocation of one existing 8 inch off-site sewer main connecting to the on-site system. Exhibit 10, "Sewer Master Plan," illustrates the planned sewer system to serve the Project.




Exhibit 8

*Source: Architerra Design Group*

**Pedestrian and Bicycle Mobility**

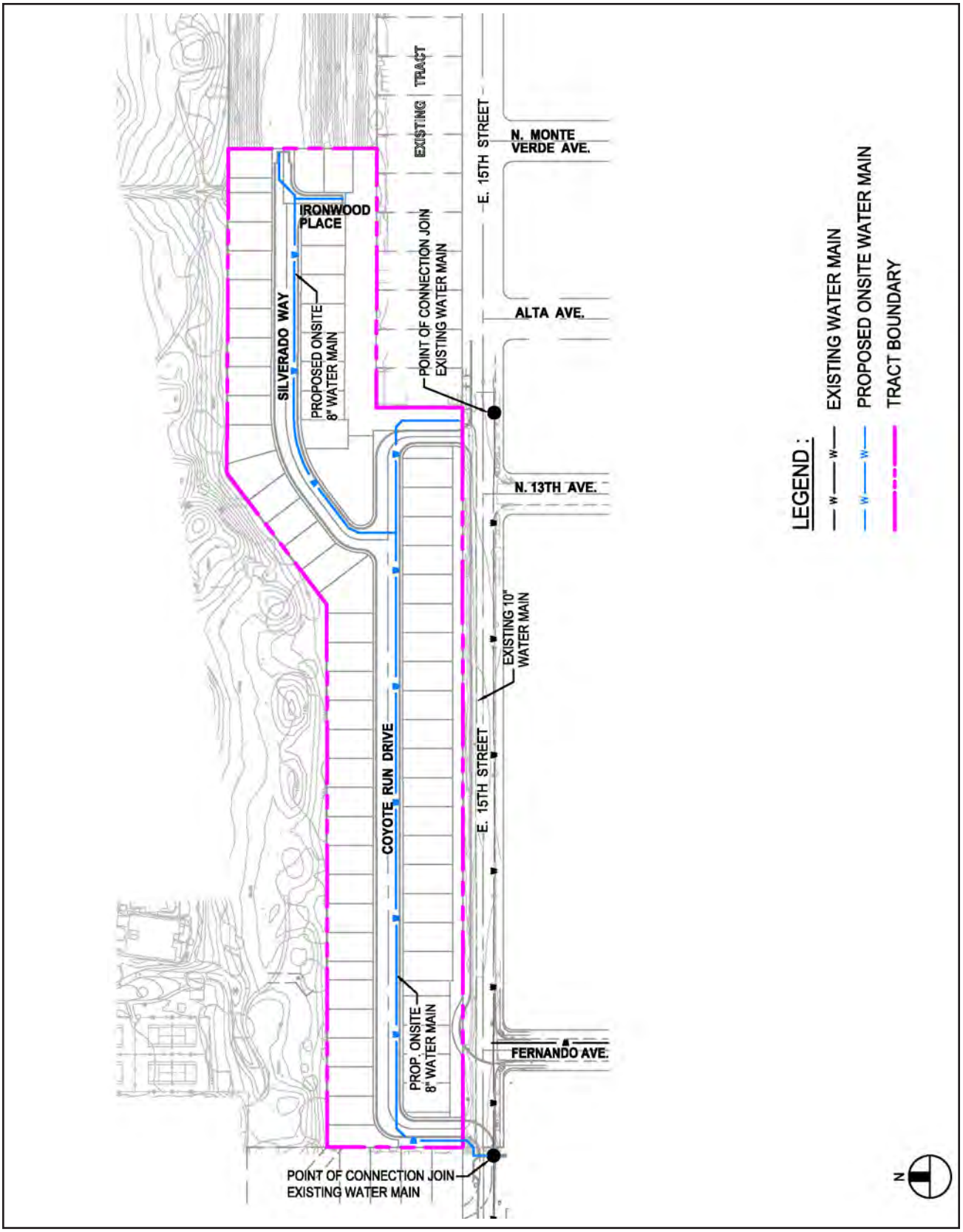



Exhibit 9

*Source: Madole & Associates, Inc.*

**Water Master Plan**

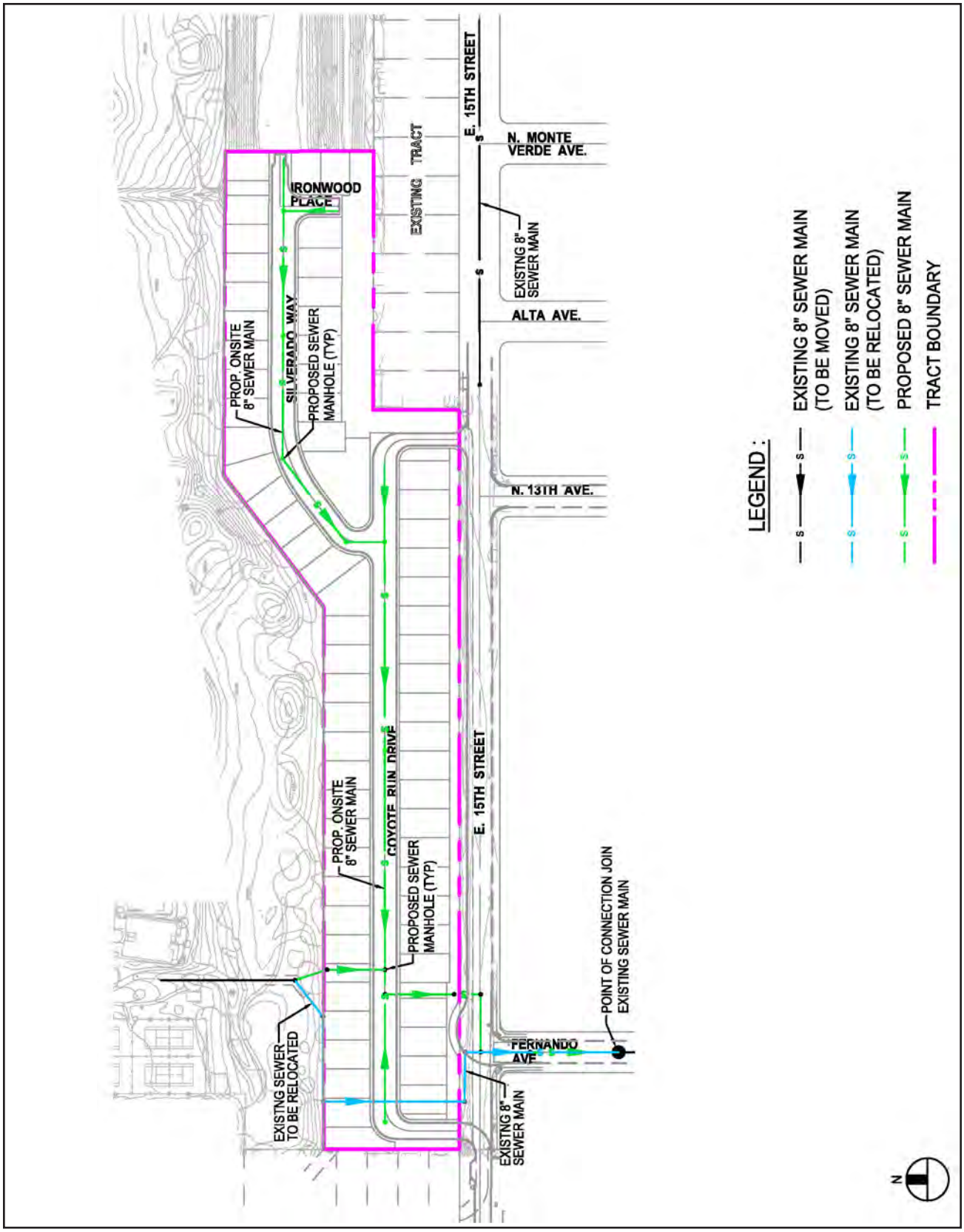



Exhibit 10

**Sewer Master Plan**

*Source: Madole & Associates, Inc.*

### 2.3.3 Storm Drain and Water Quality Management

The existing drainage pattern for the Project Site generally drains from east to west as part of a regional detention basin consisting of an essentially flat bottom, with 3:1 side slopes.

#### 2.3.3.1 Drainage

The proposed drainage plan for the Project will drain the single family lots and streets into a storm drain collection system on site, which includes street flow. Runoff will then be passed through an underground infiltration basin and outlet into a new 12-foot by 8-foot reinforced concrete box culvert which outlets into the detention basin. Modifications to the existing flood control and detention basin as part of the Project are discussed in Section 2.5, "Basin Modifications and Site Preparation."

#### 2.3.3.2 Water Quality

The Project provides for storm water retention and infiltration on the Project Site to mitigate an 85th percentile storm. This is accomplished by passing the on-site runoff through a continuous deflection separator (CDS) unit for pretreatment and then an underground infiltration basin to infiltrate runoff from the majority of the site. The underground infiltration basin is proposed to be 23' x 123' and will have dual 72" perforated pipes encased in gravel. In addition, two bioretention treatment systems designed to treat storm water are proposed, one located at each project entry, to treat on-site areas that are not tributary to the underground basin. The biotreatment systems proposed for use within the Project Site are trademarked as "Modular Wetland Systems." Detailed information on these systems can be found on the company website at *biocleanenviornmental.com.*

Exhibit 11, "Storm Drain Master Plan," illustrates the proposed storm drain and water quality management system to serve the Project Site.

## 2.4 Public Utilities

### 2.4.1 Telephone and Cable

Verizon will provide telephone service to the Project Site. Proposed on-site facilities will be placed underground.

### 2.4.2 Natural Gas

The Southern California Gas Company (Gas Company) will provide natural gas to the Project Site. Gas mains will be installed to the Project Site by the Gas Company as necessary.

### 2.4.3 Electricity

Southern California Edison will provide electricity to the Project Site from existing facilities in the vicinity of the Project Site. Proposed new facilities to serve the Project will be owned and operated by Southern California Edison and located underground.

### 2.4.4 Solid Waste

The City of Upland contracts with Burrtec Waste Industries (BWI), a private refuse hauler, to provide solid waste collection services for the City. Refuse service will be provided by BWI for the Project.

### 2.4.5 Schools

School facilities will be provided by the Upland Unified School District. The Project will be required to pay school fees in accordance with Government Code Section 65995 of the State of California.

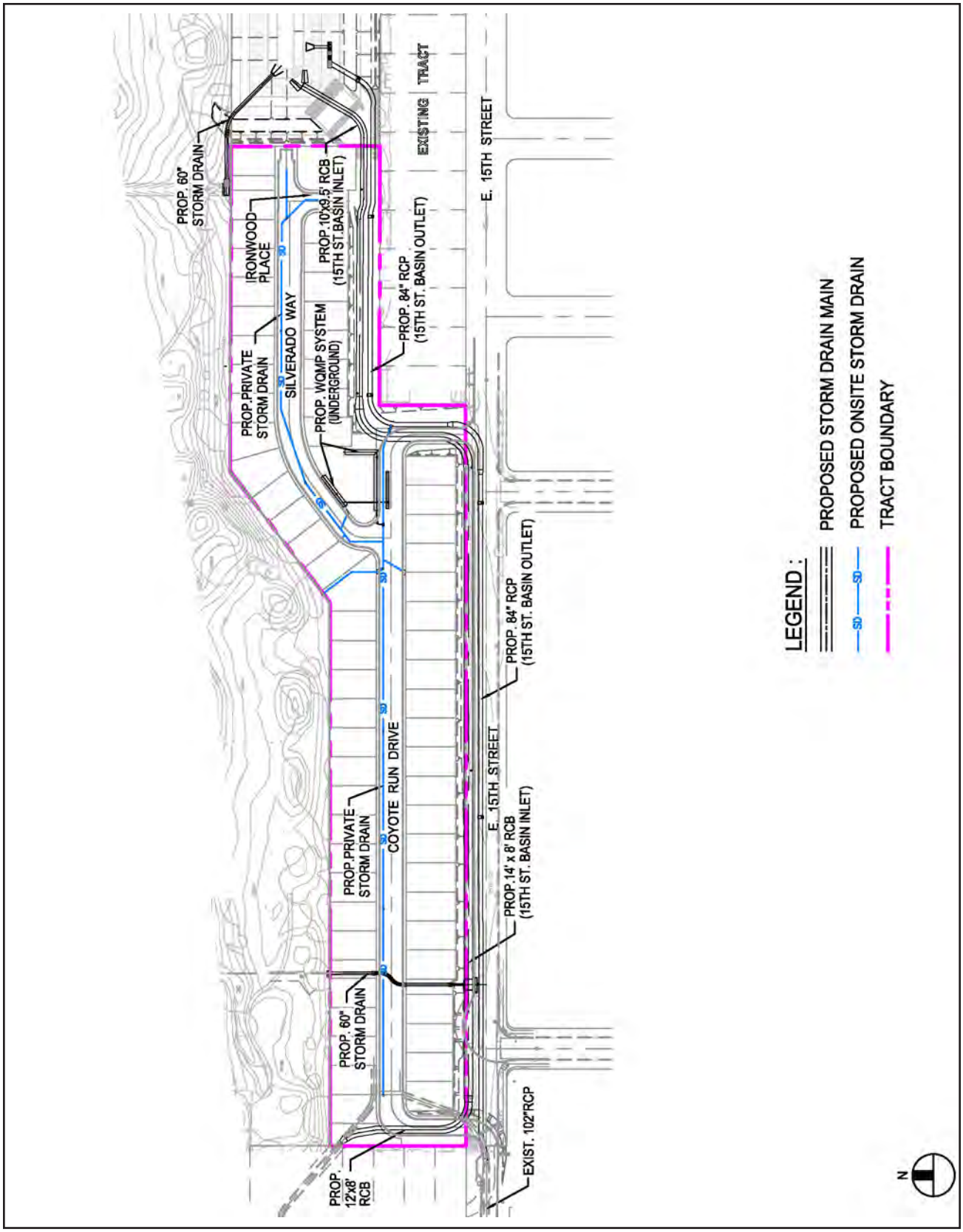



Exhibit 11

*Source: Madole & Associates, Inc.*

**Storm Drain Master Plan**

## 2.5 Basin Modifications and Project Grading

The existing Project Site comprises 9.16 acres of an existing approximately 20 acre flood control and detention basin. The existing ground slopes are predominantly flat grades with less than 0.5% slope at the bottom of the basin, then generally sloping from east to west with 3:1 slopes that make up the basin sides.

As part of the Project, modifications will be made to the existing basin to create the 9.16-acre Project Site. The conceptual plan for the basin modifications is illustrated in Exhibit 12, "Conceptual Basin Modification Plan" and is described below.

In 2017, the consulting firm of Madole and Associates, Inc. prepared a Drainage Study in the City of Upland for the 15th Street Basin. The intent of this study was to "determine if the current basin has excess capacity, which could lead to the reduction in area of the basin and allow for "surplus" property for development." Based on the analysis, the study determined that a surplus parcel of 9.16 acres, located on the westerly end of the existing basin could be created, and that the remaining basin area of approximately 11 acres would be sufficient for flood control operations without demonstrably impacting downstream facilities. The limits of the proposed Project Site are based on the recommendations in the Madole Report which includes requirements for relocation of existing basin infrastructure, reconfiguration of the basin itself by filling in the 9.16-acre development portion, reconfiguration of the remaining approximately 11 acres making the bottom of the basin deeper, and modification of the inlet/outlet structures. The recommended improvements to be made are described below.

a. Extension of the basin inlet, located in the northwest corner of the existing basin, to the new eastern edge of the Project Site. New storm drain improvements will consist of a combination of 12'x8' and 10'x9.5' RCBs. The improvements will extend approximately 1900 LF from west to east along the southern edge of the Project Site and outlet through a new headwall in the modified basin. The modified inlet will also pick up two existing smaller inlets tributary to the basin within the proposed Project Site as described below.

   - An existing local inlet pipe located approximately 300' east of the Project Site's easterly boundary is anticipated to be a 36" RCP routed through the Project Site to the new inlet RCB.
   - An existing concrete trapezoidal channel located approximately 60' west of the eastern edge of the Project Site will be picked up in an approximately 48" diameter pipe and routed through the Project Site into the new inlet RCB.

b. Extension of approximately 1,800 linear feet of the basin outlet from the western edge of the Project Site to the eastern edge of the Project Site. This extension is proposed to be a 102" RCP to account for the design outlet as well as the spillway flows and includes a new outlet structure in the basin. The proposed pipe will extend from the southeast corner of the Project Site westerly to the proposed Project main entry, then south into 15th Street and west along 15th Street connecting to the existing outlet pipe. Easements will be granted to the City of Upland for all basin infrastructure proposed to be located within the Project Site.

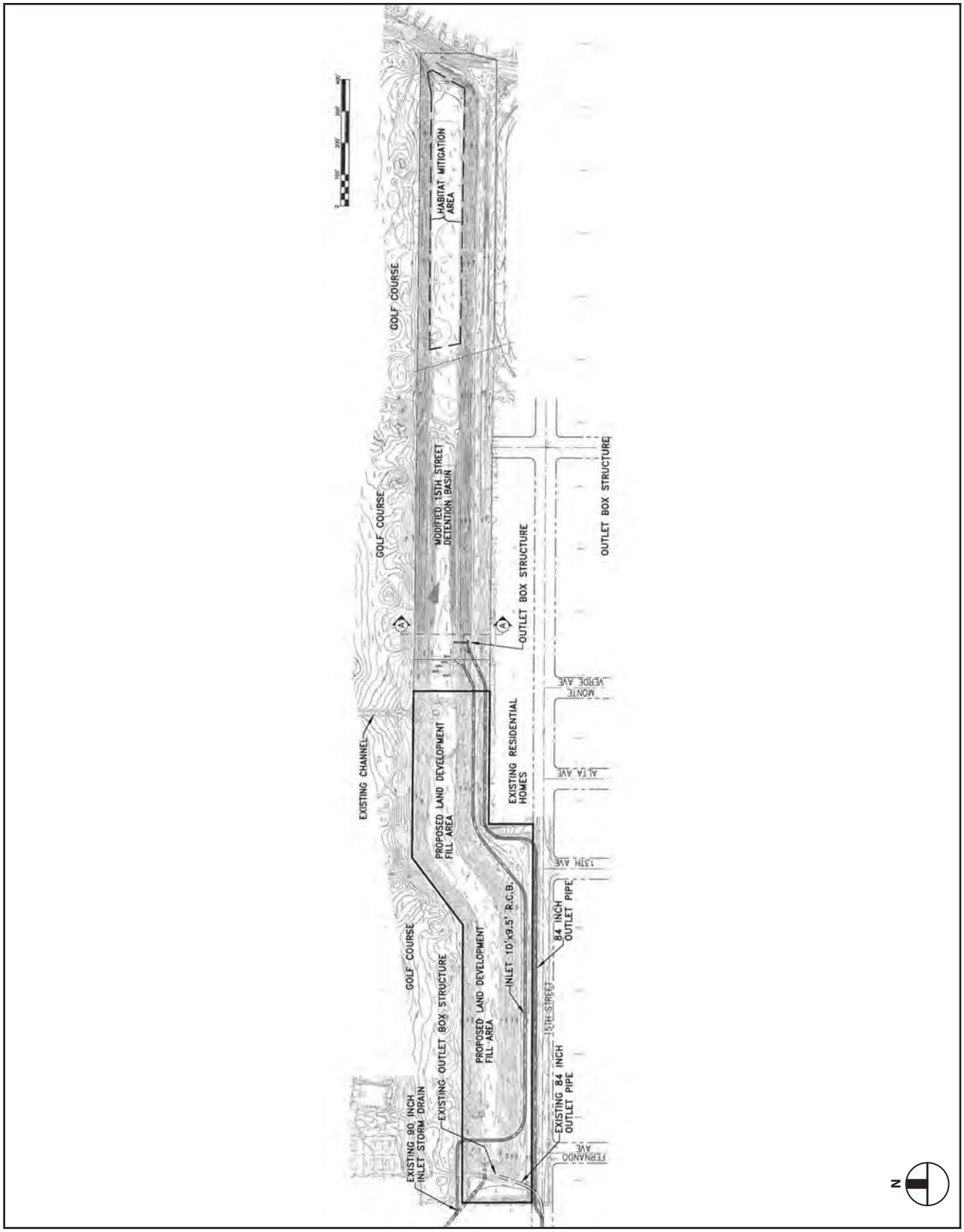



Exhibit 12

*Source: Madole & Associates, Inc.*

**Conceptual Basin Modification Plan**

County of San Bernardino policies require detention basins to have spillways designed to handle the fully developed 1,000-year storm peak flow rate defined as 135% of the 100-year storm or the peak flow rate required by the State's Division of Safety of Dams, whichever is greater. Spillways must be properly connected to a storm drain, drainage channel, street, or established watercourse.

As part of the basin modifications proposed as part of the Project three spillway structures are proposed which collectively will enable the passage of a 1,000-year storm event.

- A reinforced concrete inlet box, connecting to a proposed 84-inch outlet storm drain.
- A proposed reinforced concrete broad-crested weir to be located at the southwest corner of the detention basin with a bottom width of 60-feet, designed to outlet into a proposed graded drainage channel running east to west along the southern edge of the Villa Serena project and onto 15th Street.
- A proposed reinforced concrete broad-crested weir to be located along the southern edge of the detention basin immediately north of the terminus of Grove Street with a bottom width of 40-feet, which outlets onto Grove Street.

The combined capacity of these three spillway structures in the detention basin proposed as part of the Project will meet the county's criteria to allow the passage of the 1,000-year storm event.

A portion of the remaining approximately 11 acres proposed for the modified basin will be graded to create a new basin footprint filling the western edge of the basin located at the easterly boundary of the Project Site and creating a new berm between the basin and Project Site. From the top of the berm, a new slope will be graded to the bottom of the basin proposed to be at an approximate elevation of 1,410 feet.

Modifications to the bottom of the existing basin will be made from the toe of the new slope to a point approximately 900 linear feet to the east, by grading the bottom of the basin in this area to an elevation of approximately 1,410 feet from an existing elevation of 1,414 to 1,415 feet. The excess cut material generated can be utilized as fill for the proposed new berm located at the westerly edge of the new basin as well as for fill within the proposed Project Site. The remainder of the existing basin will be untouched by the Project. Total earthwork for the Project is estimated to be approximately 46,000 cubic yards of cut, and 87,000 cubic yards of fill, resulting in import of roughly 41,000 cubic yards.

The grading operation for the Project Site itself will generally consist of demolition, clearing, grubbing, and moving of surface soils to construct streets, building pads, and driveways. Grading within the Project Site will attempt to balance cut/fills for the site.

Grading plans for the Project will be reviewed and approved by the City of Upland Land Development and Transportation Division of the Public Works Department prior to the issuance of grading permits. All grading plans and activities will conform to the City grading ordinance and dust and erosion control requirements. The conceptual grading plan for the Project Site is illustrated in Exhibit 13, "Conceptual Grading Plan" and in Exhibit 14, "Conceptual Grading Plan Cross Sections."

## 2.6 Fire Safety

The Project will incorporate measures for fire safety to include construction of emergency vehicle access entries from 15th Street, new fire hydrants, and designation of restricted red curb areas as part of Project implementation. The plan for the provision of fire protection improvements is illustrated in Exhibit 15, "Fire Safety Plan."

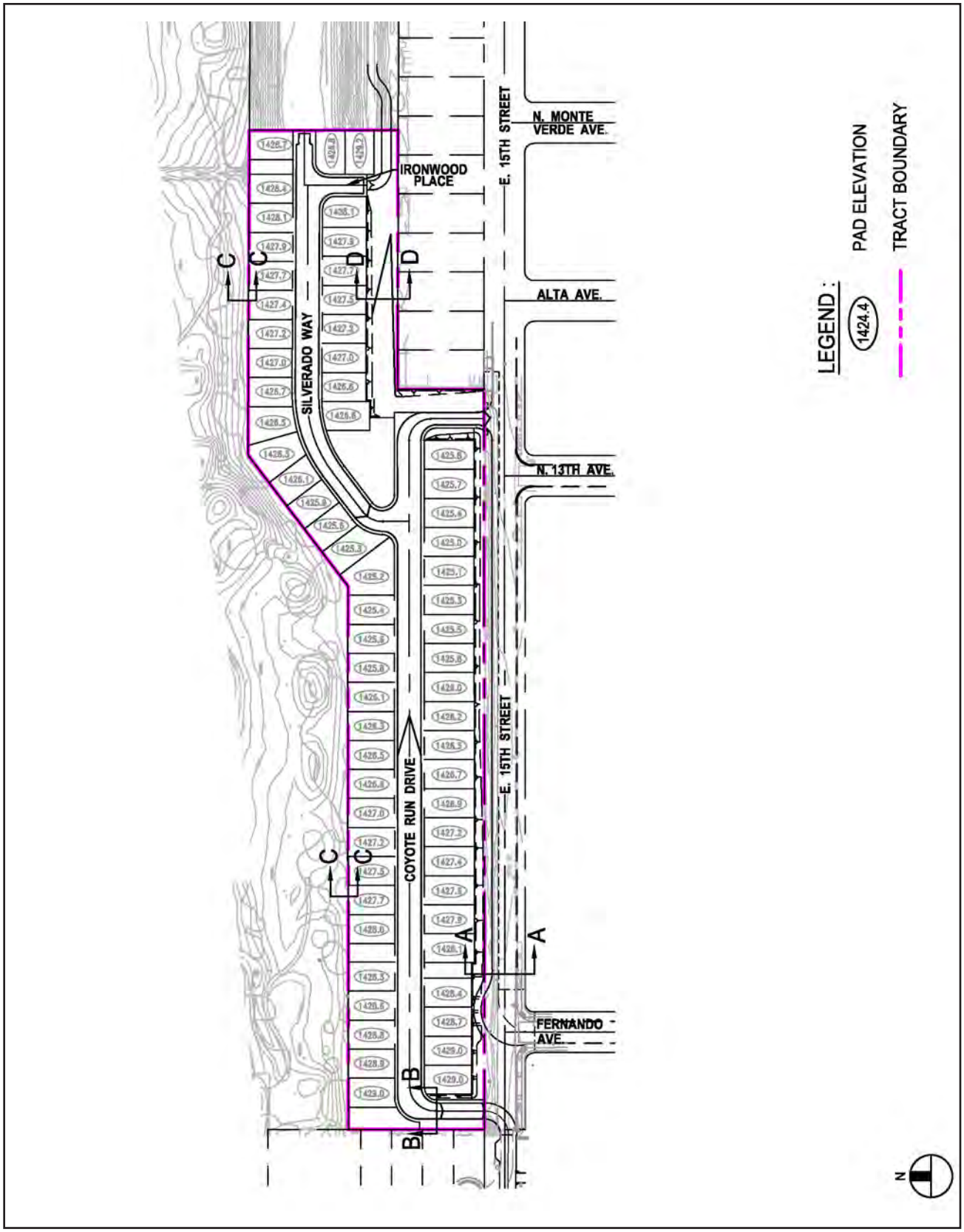



Exhibit 13

*Source: Madole & Associates, Inc.*

**Conceptual Grading Plan**

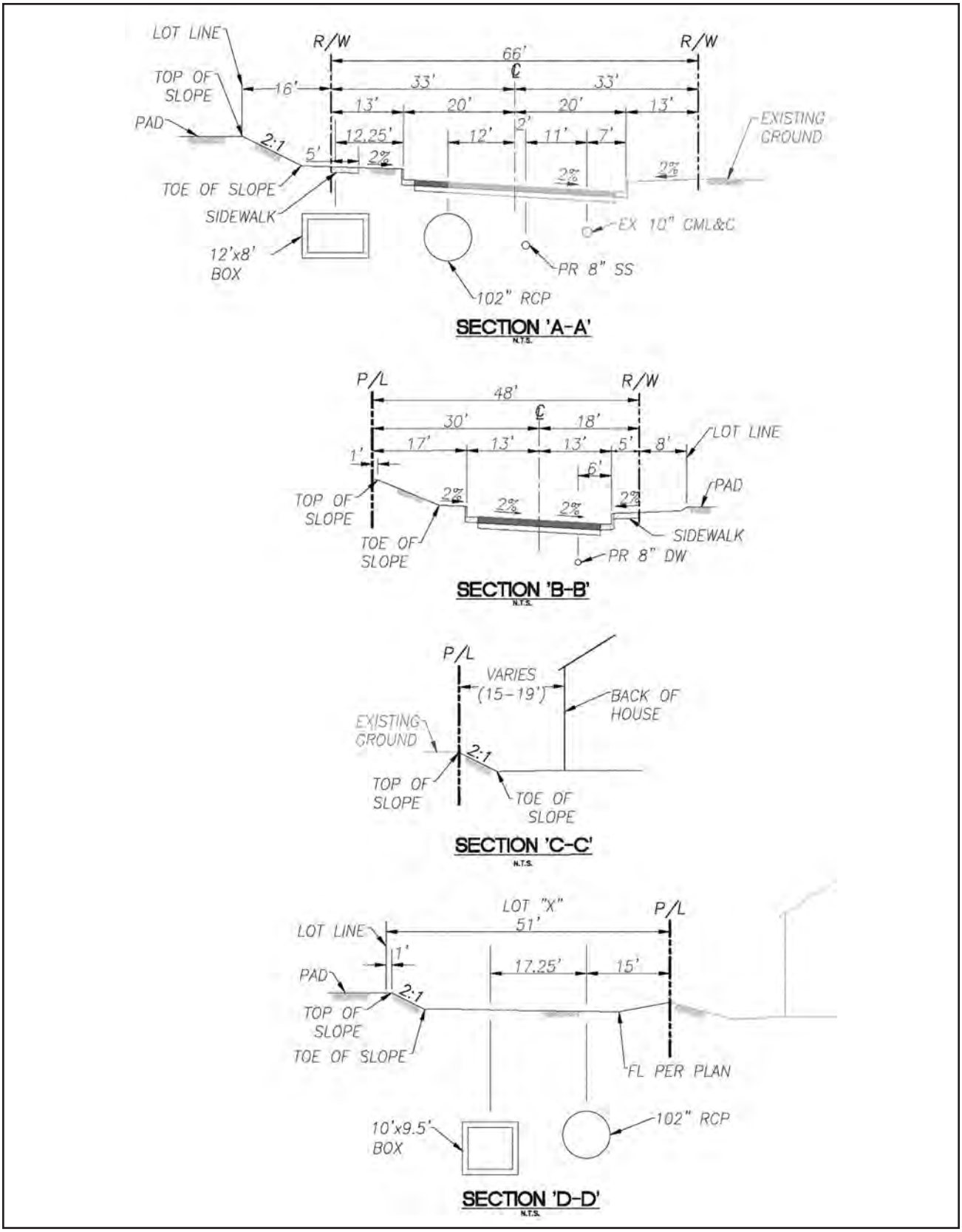



Exhibit 14

*Source: Madole & Associates, Inc.*

## Conceptual Grading Plan Cross Sections

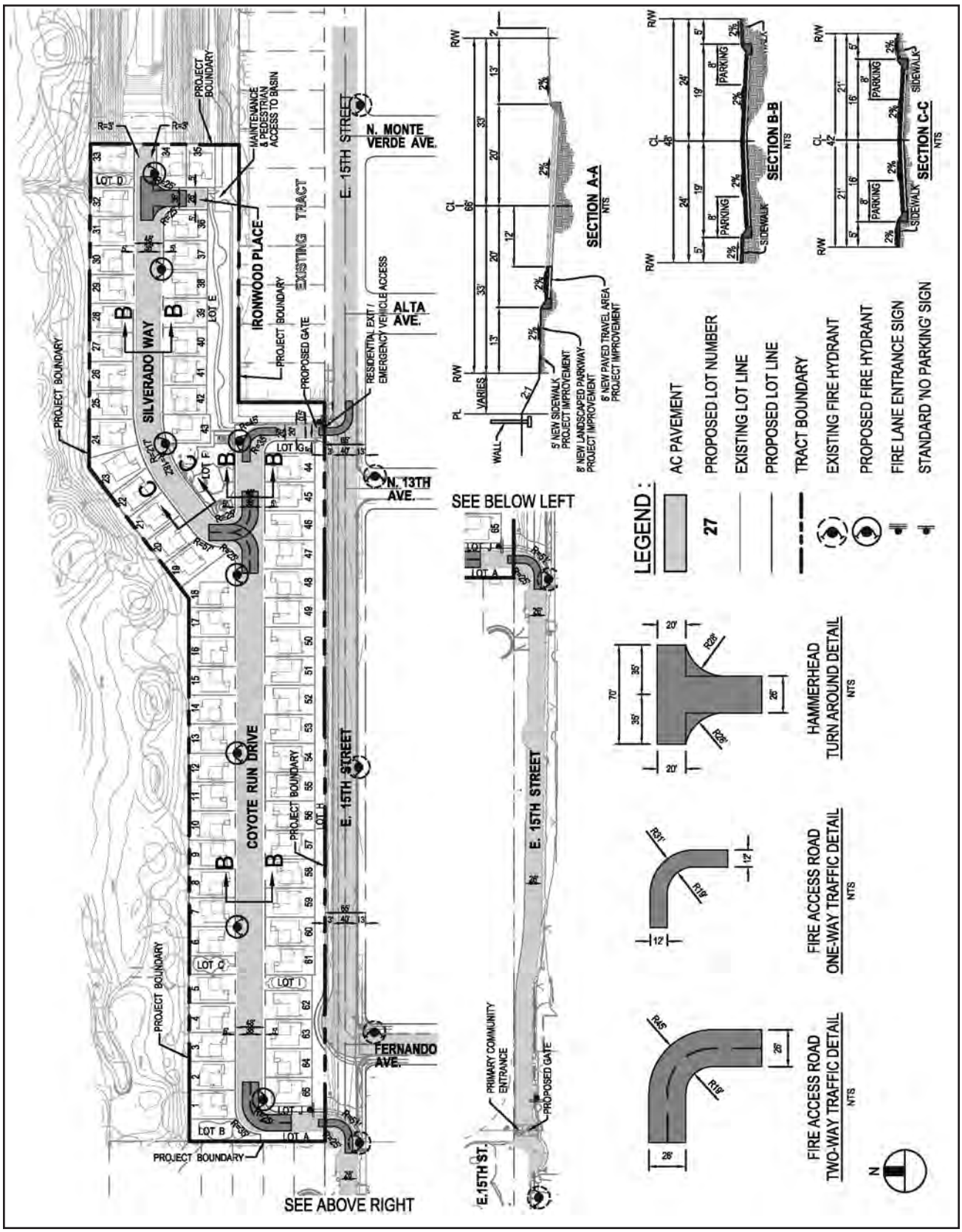



Exhibit 15

*Source: Madole & Associates, Inc.*

## Fire Safety Plan

# Section 3. Development Regulations

## 3.1 Introduction

The provisions contained herein shall regulate design and development within the Project Site. These regulations establish the minimum standards and requirements for development of residential uses, common area open space, landscaping, fences, walls, signage and lighting within the Project Site.

## 3.2 Definition of Terms

The meaning and construction of words, phrases, titles, and terms shall be the same as provided in Upland Municipal Code Title 17, "Planning and Zoning," (Zoning Code) Chapter 7 (Definitions) unless otherwise specifically provided for herein.

## 3.3 Applicability

The Specific Plan serves to implement the City's General Plan and establishes the zoning regulations for the Project Site. These Development Regulations address general requirements, permitted uses, and development standards for all development within the Project Site. Application of these Development Regulations is intended to encourage the most appropriate use of the land, ensure the highest quality of development, and protect the public health, safety, and general welfare. Whenever the provisions and development standards contained herein conflict with those contained in the Zoning Code, the provisions of the Specific Plan shall take precedence. Where the Specific Plan is silent, the Zoning Code shall apply. These Development Regulations shall reinforce specific site, architectural, and landscape design criteria contained in Section 4, "Design Criteria" of the Specific Plan. All architectural and landscape improvements shall comply with Section 4, "Design Criteria" of the Specific Plan.

## 3.4 General Site Development Standards

The following general site development standards shall apply to all development within the Project Site.

a. Maximum Number of Dwelling Units – A maximum of 65 residential dwelling units is permitted for development within the Project Site.

b. Common Area Open Space – A minimum of 42,000 square feet of private common area open space shall be provided within the Project Site for recreational use by Project residents. An additional .15 acres off-site shall be improved as part of the Project for public open space.

c. Grading – Development within the Project Site shall utilize grading techniques as approved by the City of Upland. Grading concepts shall respond to the design criteria included in the Specific Plan.

d. Building Modification – Residential building additions and/or alterations permitted by the Specific Plan shall match the architectural style of the primary dwelling unit and shall be constructed of the same materials, details, and colors as the primary dwelling unit.

e. Utilities – All new and existing public utility distribution lines of 34.5 kV or less shall be subsurface throughout the project.

## 3.5 Green and Sustainable Development Standards

The following green and sustainable development standards shall apply to development within the Project Site.

a. Technology – All homes shall be equipped with modern telecommunications technology for computer internet access, phone, fax, and television. Fiber optics cable shall be installed

to all the properties if available from the utility provider.

b. Energy Efficiency - All homes shall be constructed to meet or exceed the California Building Code Title 24 energy standard.

   Energy efficient design techniques include, but are not limited to, the following:

   - Increased insulation to minimize heat transfer and thermal bridging.
   - Roof orientations and design to accommodate homeowner installation of rooftop solar electric equipment.
   - Heating and cooling distribution systems that limit air leakage throughout the structure to minimize energy consumption.
   - Installation of ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, and other applicable electrical equipment.
   - Installation of efficient lighting and lighting control systems and a building design which utilizes daylight as an integral part of the lighting system.
   - Installation of "cool roofs" and cool pavements.
   - Installation of solar light-emitting diodes (LEDs) for outdoor lighting or low level lighting.

c. Builder-installed indoor appliances, including dishwashers, showers, and toilets, shall be low-water use in compliance with the adopted California Building Code.

d. Solid Waste/Recycling - Development within the Project shall comply with City of Upland requirements for the provision and placement of solid waste and recycling receptacles. The homeowners association for the Specific Plan shall provide educational information on recycling to all homeowners as part of the initial purchase of homes and again thereafter on an annual basis.

e. During Project construction the developer shall use clean-burning diesel fuel, biodiesel fuel, and/or other alternative fuels for heavy construction equipment to reduce construction emissions. During Project construction, the developer shall use locally produced and/or manufactured building materials (materials that are obtained from sources using the least amount of transport) for at least 10 percent of the construction materials used, shall recycle or reuse at least 50 percent of the demolished and/or grubbed construction materials, and use "Green Building Materials," such as those that are resource efficient and are recycled and manufactured for at least 10 percent of the Project.

f. Drought-tolerant and/or native landscaping materials shall be used in all public and common areas to reduce water consumption.

g. Smart Controller irrigation systems shall be installed in all public and common area landscaping.

h. Landscape areas shall be designed on a "hydro zone" basis to group plants according to their water and sun requirements.

## 3.6 Permitted Uses and Structures

The following uses and structures are permitted "by right" within the Specific Plan subject to approval by the City of Development Plan Review pursuant to Zoning Code Section 17.44.030 (Development Plan Review). Any proposed use not specifically listed is not permitted unless the Development Services Director finds that the proposed use is equivalent to a listed permitted use and is permitted pursuant to the procedures established in Zoning Code Section 17.02.020 (Authority) "Unlisted Land Uses." Short term rental units (STRs) and Accessory Dwelling Units (ADUs) are prohibited uses within the Specific Plan.

a. Residential single family detached dwelling units and garages.

b. Residential attached and detached patios and patio covers.

c. Public or private parks, recreational buildings, greenbelts, and/or common area open space.

d. Small family child care/day care facilities (up to 8 children).

e. Large family child care/day care facilities (up to 14 children).

f. Accessory uses and structures to include the following and which conform to the provisions of Zoning Code Section 17.19 (Accessory Uses and Structures).

   1. Swimming pools, spas, sports courts, and other similar outdoor recreational amenities.

   2. Storage structures, garden structures, cabanas, and greenhouses.

g. Home occupations pursuant to regulations established for Home Occupations per Upland Municipal Code Section 17.27, "Home Occupations."

h. Cottage Food Operations per Upland Municipal Code Chapter 17.25 "Cottage Foods Operations."

i. Model home and subdivision sales trailers, temporary construction parking, offices and facilities, real estate signs, signage indicating future development and directional signage pursuant to approval by the City of Development Plan Review per Upland Municipal Code Section 17. 44.030 (Development Plan Review).

## 3.7 Residential Development Standards

Residential development areas are subject to the development standards contained in Table 3.1 “Residential Development Standards.”

Table 3.1

## Residential Development Standards

| SFD RESIDENTIAL USE | |
|---|---|
| **Lot Criteria** | |
| Min. Lot Width | 47' |
| Min. Lot Depth | 71' |
| Min. Lot Area (sq. ft.) | 3,337 |
| **MINIMUM SETBACKS (1) (2) (3)** | |
| **Front Setback** | |
| Living Area | 10' |
| Street Facing Garage | 19’ |
| **Side Setback** | |
| From Interior PL | 5’ |
| From Street | 5' |
| Patio Covers | 5' |
| **Rear Setback** | |
| Main Structure | 15’ |
| Patio Covers | 5' |
| **Lot Coverage** | |
| Max. Coverage | 60% |
| **Maximum Building Height (4)** | |
| Main Structure | 2 Stories - Max. 35’ |
| Patio Covers | 15' |
| **Walls, Fences and Hedges** | |
| Maximum Height at Interior or Rear Property Line (5) | 6’ |
| Maximum Height of Project Perimeter Walls | 6’ |
| Maximum Height of Retaining Walls at Project Boundary | 4' |
| Maximum Height of Retaining Walls Between Lots and within Project Boundary | 4' |
| **Parking** | |
| Min. Number of Parking Spaces Required (6) | 2 per unit within a garage plus 2 open spaces per unit |

*Footnotes:*

*(1) Architectural projections and cantilevers may project a maximum of 2 feet into required front and side setback areas and 3 feet into required rear setback areas measured from the foundation to the roof plate; however, in no case shall such projection be closer than 3 feet to any property line. An architectural projection is defined as an element that articulates the building elevation such as eaves, window and door pop-out surrounds, media niches, bay windows, pot shelves, chimneys, enhanced window sills, shutter details, window trim, balconies and entry gates, and other similar elements.*

*(2) All setbacks measured from PL unless noted otherwise.*

*(3) Rear setback for main structure may be reduced by up to 2 feet for a maximum of 10 percent of the total number of units.*

*(4) Architectural projections to include chimneys and antennas may exceed the maximum building height by an additional 5 feet.*

*(5) Refer to Section 3.10.2 (Fence and Wall Standards).*

*(6) All enclosed parking spaces within a garage shall be a minimum clear dimension of 20’ x 20’ for two spaces and 10’ x 20’ for single spaces. All open parking spaces shall be a minimum dimension of 9’ x 19’. All parallel spaces shall be a minimum dimension of 8'x22'.*

## 3.8 Temporary Uses

Temporary uses shall be permitted pursuant to Zoning Code Chapter 17.41, "Temporary Use Permits and Film Permits."

## 3.9 Open Space Development Standards

a. A central private common area open space area shall be improved with recreational facilities to serve all age groups of residents of the Project. The following minimum improvements shall be constructed within the central common area open space area:

   1. Swimming pool.
   2. Pool house to include restrooms/changing rooms and drinking fountains.
   3. Park furniture including benches and trellises.
   4. Trash receptacles.
   5. Barbecue area(s) provided with picnic tables and barbeque grills.
   6. Children's play area.

b. Private on-site pocket parks and an off-site public pocket park shall be constructed to include, at a minimum, open play areas, tot lots, park furniture, and trash receptacles per the criteria for each lot established in Section 4, Design Criteria.

c. Open space improvements shall be approved by the City as part of Development Plan Review.

## 3.10 Landscaping, Fencing, and Walls

All landscape and irrigation plans for streetscapes and common area open space including graphic designs with regard to the identity of the Specific Plan, neighborhood identity, or entry monuments shall conform to the regulations as set forth herein and shall be subject to review and approval by the City at the time of Development Plan Review. The form and content of landscape plans for streets, common area open space, and other common areas shall conform to the requirements of the City's Development Plan Review application requirements.

### 3.10.1 Landscape and Irrigation Standards

a. All landscaping within the Project shall comply with the provisions of Section 4, "Design Criteria" of this Specific Plan utilizing plant materials specified on the "Suggested Plant List" established for the Specific Plan.

b. Landscape streetscape improvements for streets within the Project shall conform to the landscape treatment described for these streets within Section 4 "Design Criteria" of this Specific Plan.

c. The design and improvement of all common area landscaping, including landscape and irrigation plans, shall be reviewed and approved by the City at the time of Development Plan Review and shall conform with the requirements of Section 4 "Design Criteria" of this Specific Plan.

d. Installation of landscaping and automatic irrigation within the front yards of all residential areas shall be provided by the home builder and maintained in a healthy condition at all times. At a minimum, the builder shall install groundcover and appropriate shrubs and trees in the front yards of homes within residential areas. A minimum of one 24 inch box shade tree shall be installed within each residential front yard. A variety of landscape designs shall be provided by the homebuilder to the homeowner. All landscape plans shall be reviewed and approved by the City at the time of Development Plan Review.

e. No more than 50% of a front or side yard of a residential lot shall be dedicated to driveways, hardscape and walkways.

f. All manufactured and cut/fill slopes exceeding three (3) feet in height shall be planted with an effective mixture of ground cover, shrubs, and trees installed by the developer. Such slopes shall also be irrigated as necessary to comply with any requirements established by the City.

g. Boundary landscaping shall be required adjacent to the Project Site along the perimeter of 15th Street. Landscaping shall generally be placed along the perimeter property line adjacent to 15th Street in accordance with the landscape design illustrated in Section 4, "Design Criteria," of the Specific Plan.

h. Landscaping and automatic irrigation systems within the public rights-of-way and private common areas of the Project shall be installed by the developer.

### 3.10.2 Fence and Wall Standards

a. Freestanding, decorative perimeter walls and view open fencing shall be provided within and at the perimeter of the Project Site as specified in the "Wall and Fence Master Plan" pursuant to Section 4, "Design Criteria," of the Specific Plan. Such walls and fences shall be constructed concurrently with the construction of improvements required for development of the Project.

b. Perimeter walls and fencing shall be constructed consistent with the "Wall and Fence Details" pursuant to Section 4, "Design Criteria," of the Specific Plan. Perimeter walls shall not exceed six feet in height from highest finished grade. Retaining walls on the 15th Street perimeter shall not exceed four feet in height. If required for sound attenuation, perimeter walls may exceed six feet in height from highest finished grade, subject to the recommendations of an acoustical study as approved by the Director of Development Services.

c. Individual residential side and rear yard walls and fencing shall not exceed six feet in height from highest adjacent finished grade. Interior retaining walls in public view shall not exceed four feet in height from highest adjacent finished grade. Side and rear walls may exceed six feet in height from adjacent finished grade if required by the City for sound attenuation pursuant to the recommendations of an Acoustical Report and as approved by the Director of Development Services. All side and rear yard fences and walls shall be constructed consistent with the "Wall and Fence Details" pursuant to Section 4, "Design Criteria," of the Specific Plan.

d. All perimeter wall and fence materials throughout the Project shall be of uniform manufacture with colors specified for the overall design theme as provided for in Section 4 "Design Criteria," of this Specific Plan.

## 3.11 Signage

A Master Sign Program shall be submitted by the developer of the Project and approved by the City subject to approval of Development Plan Review pursuant to Zoning Code Section 17.44.030 (Development Plan Review). The Master Sign Program shall address residential project entries, residential neighborhood identification signs, and way finding signs within the project. No project signs shall be permitted in the public right-of-way.

### 3.11.1 Master Sign Program Contents

The sign program shall address, at a minimum, the following:

a. Permitted signs.

b. Prohibited signs.

c. The hierarchy of signage.

d. Definition of types of signs.

e. Locations and dimensions for monument signs and public facilities signs.

f. Locations and dimensions of directional signage.

g. Provisions for size, location, and duration of display of temporary signs.

h. Permitted sign types, styles, construction materials, colors, and lettering styles.

i. Requirements for a sign permit application.

j. Procedures for obtaining approval of a sign permit.

k. Procedures for amending the sign program.

## 3.12 Lighting

### 3.12.1 General Requirements

Project Site lighting shall be installed in accordance with the following standards.

a. No light glare incidental to any use shall be visible beyond any boundary line of the Project Site.

b. Residential fixtures shall be uniform and unobtrusive. Shielded fixtures are required to prevent up lighting and to shield lighting source from adjacent residential areas.

### 3.12.2 Public Street Lights

Public streetlights installed along 15th Street as part of the Project shall be LED. Design of fixtures shall be approved by the City as part of Development Plan Review.

### 3.12.3 Private Street Lighting Fixtures

a. Private street lighting shall conform to the City's requirements for street lighting.

b. Private street lighting fixtures shall be on sensors for automatic nighttime lighting. Style and specifications for all street lights shall be approved by the City as part of Development Plan Review.

c. Street lighting within the Project Site shall comply with City specifications.

d. Private street lights shall include shielding devices for "dark sky" purposes and shall direct or reflect light downward.

### 3.12.4 Common Area Open Space Lighting

a. Lighting within common area open space shall be approved by the City as part of the City's Development Plan Review of these facilities.

b. Bollard lighting is recommended along walkways within the common area open space.

c. Light fixtures shall include shielding devices for "dark sky" purposes and shall direct or reflect light downward.

# Section 4. Design Criteria

## 4.1 Purpose and Intent

The Specific Plan Design Criteria establish architectural and landscape design principles and requirements for the Project. These design criteria provide the foundation for the design and construction of an aesthetically unified residential development while also responding to existing surrounding land use.

Design Guideline Objectives:

- To provide the City of Upland with the necessary assurances that the Project will be developed in accordance with the quality and character proposed in this Specific Plan;
- To provide design criteria to developers, builders, engineers, architects, landscape architects and other professionals to ensure the desired design quality is achieved; and
- To provide development criteria to guide development of the Project as an attractive and distinctive community that responds to the character and design fabric of the surrounding existing residential community.

## 4.2 Landscape Design

Careful consideration has been given to the design of the community landscape for the Project Site. The following design criteria are organized to help define the basic landscape design principles for the Project. Conformance with these criteria will help to assure a vision and integrity of design for the Project resulting in a distinctive community image and sense of place for residents. All landscape plans, streetscape plans, and graphic designs with regard to community identity, neighborhood identity, or entry monumentation shall conform to the criteria set forth herein.

The intent of the landscape design criteria for the Project is to control the appearance of the development with respect to scale, proportion, height, materials and colors while still encouraging variety and innovation. The landscape concept for the Project is illustrated on Exhibit 16, "Conceptual Landscape Plan."

### 4.2.1 Landscape Elements

Landscape design encompasses "hardscape" elements such as entry monuments, signage, walls, fences, gates, paving, recreation and picnic equipment, as well as "softscape" elements such as trees, shrubs, vines and ground cover. All landscape elements should be compatible with the scale of the adjacent architecture and the surrounding space. Water conservation and long term maintenance should be kept in mind when selecting specific plant material. Hydrozoning (grouping plants with similar water requirements) is encouraged. Table 4.1, "Suggested Plant List" provides planting guidelines for both common and private areas. Compliance with the City's water efficient landscape ordinance is required. The following guidelines address the design of specific landscape elements within the Project.

Table 4.1

## Suggested Plant List

| Trees | | | |
|---|---|---|---|
| **Botanical Name** | **Common Name** | **Native** | **Water Use** |
| Cercis occidentalis | Western Redbud | Native | Low |
| Fraxinus o. 'Raywood' | Raywood Ash | Non-Native | Moderate |
| Pinus Eldarica | Afghan Pine | Non-Native | Low |
| Platanus racemosal | Califronia Sycamore | Native | Moderate |
| Quercus Agrifolia | Coast Live Oak | Native | Low |
| Quercus ilex | Holly Oak | Non-Native | Low |
| Tabebuia chrysotricha | Yellow Trumpet Tree | Non-Native | Moderate |

| Vines | | | |
|---|---|---|---|
| **Botanical Name** | **Common Name** | **Native** | **Water Use** |
| Ficus pumila | Creeping Fig | Non-Native | Moderate |
| Rosa banksaie 'Lutea' | Yellow Ladybanks Rose | Non-Native | Moderate |

| Shrubs | | | |
|---|---|---|---|
| **Botanical Name** | **Common Name** | **Native** | **Water Use** |
| **BACKGROUND** | | | |
| Carpenteria c. 'Elizabeth' | Elizabeth Bush Anemone | Native | Moderate |
| Heteromeles arbutifolia | Toyon | Native | Low |
| Podocarpus macrophyllus | Yew Pine | Non-Native | Moderate |
| Prunus ilicifolia | Catalina Cherry | Native | Low |
| Rhamnus c. 'Eve Case' | Eve Case Coffeeberry | Native | Low |
| Salvia clevelandii | Cleveland Sage | Non-Native | Low |
| Sambucus nigra | Black Elderberry | Native | Low |
| Tagetes lemonii | Mexican Marigold | Non-Native | Low |
| | | | |
| **MIDGROUND** | | | |
| Artemisia 'Powis Castle' | Wormwood | Non-Native | Low |
| Baccharis x 'Starn' | Starn Coyote Brush | Native | Low |
| Cistus x p. 'Sunset' | Magenta Rockrose | Non-Native | Low |
| Epilobium 'Route 66' | California Fuschia | Native | Low |
| Eriogonum fasciculatum | California Buckwheat | Native | Very Low |
| Hesperaloe parviflora | Red Yucca | Non-Native | Low |
| Leymus c. 'Canyon Prince' | Canyon Prince Wild Rye | Native | Low |
| Mimulus aurantiacus | Sticky Monkey Flower | Native | Very Low |
| Muhlenbergia capillaris | Pink Muhly | Non-Native | Low |
| Muhlenbergia dubia | Pine Muhly | Non-Native | Low |
| Muhlenbergia rigens | Deer Grass | Non-Native | Moderate |
| Ribes speciosum | Fuschia-Flowering Gooseberry | Native | Moderate |
| Rosa species | Rose | Non-Native | Moderate |
| Rosmarinus species | Rosemary | Non-Native | Low |
| Russelia equisetiformis | Firecracker Plant | Non-Native | Moderate |
| Salvia species | Sage | Native | Low |

Table 4.1
## Suggested Plant List (cont.)

| | | | |
|---|---|---|---|
| **FOREGROUND** | | | |
| Achillea millefolium | Common Yarrow | Non-Native | Low |
| Achillea x 'moonshine' | Moonshine Yarrow | Hybrid | Low |
| Baccharis p. 'Pigeon Point' | Pigeon Point | Native | Low |
| Bouteloua g. 'Blonde Ambition' | Blonde Ambition Blue Grama | Native | Low |
| Carex pansa | Meadow Sedge | Native | Moderate |
| Carex praegracilis | Ca field Sedge | Native | Moderate |
| Cistus x p. 'Sunset' | Magenta Rockrose | Non-Native | Low |
| Dianella species | Flax Lily | Non-Native | Low |
| Eriogonum f. 'Warriner Lytle' | California Buckwheat | Native | Very Low |
| Festuca i. 'Siskiyou Blue' | Siskiyou Blue Fescue | Non-Native | Low |
| Juncus p. 'Elk Blue' | Elk Blue CA Coyote Brush | Native | Low |
| Lavandula species | Lavender | Non-Native | Low |
| Rosmarinus o. 'Prostratus' | Creeping rosemary | Non-Native | Low |
| | | | |
| **PARKWAY SHRUBS AND GROUNDCOVER** | | | |
| Achillea x 'Moonshine' | Moonshine Yarrow | Hybrid | Low |
| Bouteloua g.'Blonde Ambition' | Blonde Ambition Blue Grama | Native | Low |
| Cistus x p.'Sunset' | Magenta Rockrose | Non-Native | Low |
| Festuca i. 'Siskiyou blue' | Siskiyou Blue Fescue | Non-Native | Low |
| Rosmarinus o.'Prostratus' | Creeping Rosemary | Non-Native | Low |
| | | | |
| **ENTRY SHRUBS AND GROUNDCOVER** | | | |
| Achillea x 'Moonshine' | Moonshine Yarrow | Hyrbid | Low |
| Cistus x p. 'Sunset' | Magenta Rockrose | Native | Low |
| Festuca i. 'Siskiyou Blue' | Siskiyou Blue Fescue | Non-Native | Low |
| Hesperaloe parviflora | Red Yucca | Non-Native | Low |
| Muhlenbergia rigens | Deer Grass | Non-Native | Moderate |
| Rhamnus c. 'Eve Case' | Eve Case Coffeeberry | Native | Low |
| Rosa species | Rose | Non-Native | Moderate |
| Rosmarinus o. 'Prostratus' | Creeping Rosemary | Non-Native | Low |
| Salvia species | Sage | Native | Low |




Exhibit 16

**Conceptual Landscape Plan**

*Source: Architerra Design Group*

### 4.2.2 Community Entries

The Primary Community Entry to the Project Site includes a blend of hardscape and planting elements. Entry lighting shall avoid intensely bright lighting of monuments. Entry monuments should be lit to provide a soft wash of light across the monument signage. Paving at the Primary Community Entry should provide a softened appearance while providing a hard surface for vehicle use. The Primary Community Entry shall include the following:

- Use of accent shrubs on each side of the entry drive and enhanced paving at the entry drive.
- A 6 foot high tubular steel fence and gate and a 6 foot high wall with an area for the Project identification sign, six foot high pilasters on each side of the wall with brick caps.
- A 3 foot wide pedestrian access gate adjacent to the vehicular entry gates with a six foot pilaster on each side.

The Secondary  Entry allows for resident exit only from the community and emergency vehicle access to and from the community. The Secondary Entry shall include the following:

- Parkway trees within the 15th Street right of way adjacent to the Project Site.
- A variety of accent trees and shrub masses planted in a series of layers (foreground, mid ground, background at the Project Entry, and along 15th Street adjacent to the Project Site) to help define borders and plant groupings while combining interesting foliage textures and color.
- Accent lighting for landscape and monumentation.
- Varying width landscape buffer areas located where residential side property lines abut the community entry street.
- A 6 foot high tubular steel view fence and gate with 6 foot 8 inch high pilasters on either side of the gate.

The Primary Community Entry is illustrated on Exhibit 17, “Primary Community Entry” and Exhibit 18, "Primary Community Entry Elevation View."

The Secondary Community Entry for the Project at 15th Street is illustrated on Exhibit 19, "Secondary Entry."

### 4.2.3 Streetscapes

Streetscape design within the interior of the Project Site shall be consistent in character and should help to promote pedestrian circulation within the community. Streetscapes are designed to provide a clear delineation between pedestrian and vehicular travel areas. Shrubs, low groundcovers, and "California Friendly" ornamental grasses are used to the greatest extent possible to reduce maintenance and conserve resources. The planting plan for streets includes informal plantings of trees, shrubs, groundcovers, and grasses. Uniformed spacing of trees is avoided in order to create an interesting and inviting pedestrian experience while also offering visual interest to motorists encouraging them to slow driving speeds and observe their surroundings. The following design criteria apply to streetscape design for the Project.

- Landscape treatments of each street shall be consistent throughout the length of the street in the neighborhood.
- Landscape treatments shall generally utilize street trees planted at intervals of 50 feet on center as feasible. Street trees shall be placed a minimum of eight feet from street light standards.
- Street tree planting as described below shall generally utilize one or two primary species for each street with a limited number of additional species to be used as accent planting.

The streetscape plan for Project streets is illustrated on Exhibit 20, “Streetscape Key Map,” and Exhibits 21-27, “Streetscape Sections.”

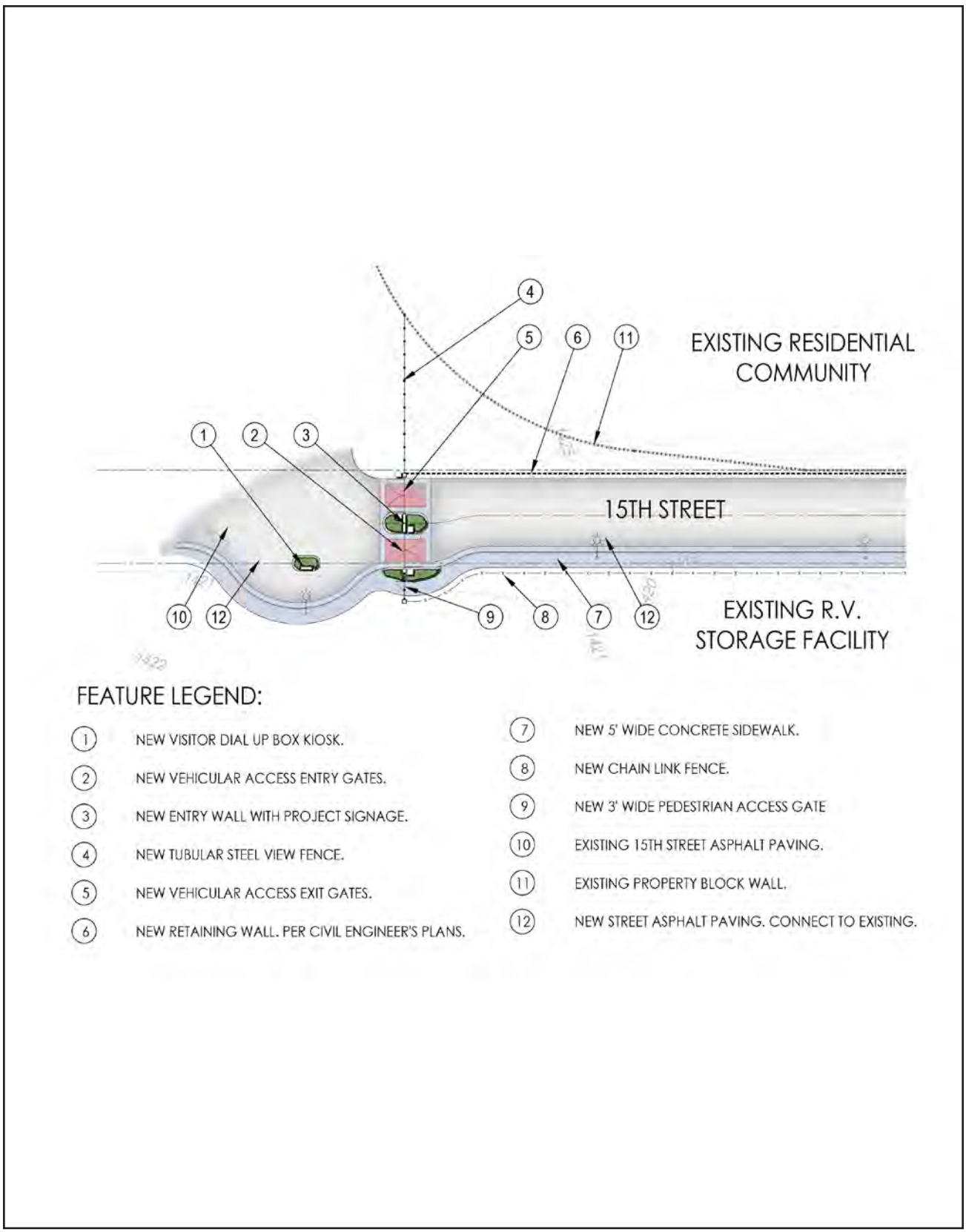



Exhibit 17

*Source: Architerra Design Group*

**Primary Community Entry**

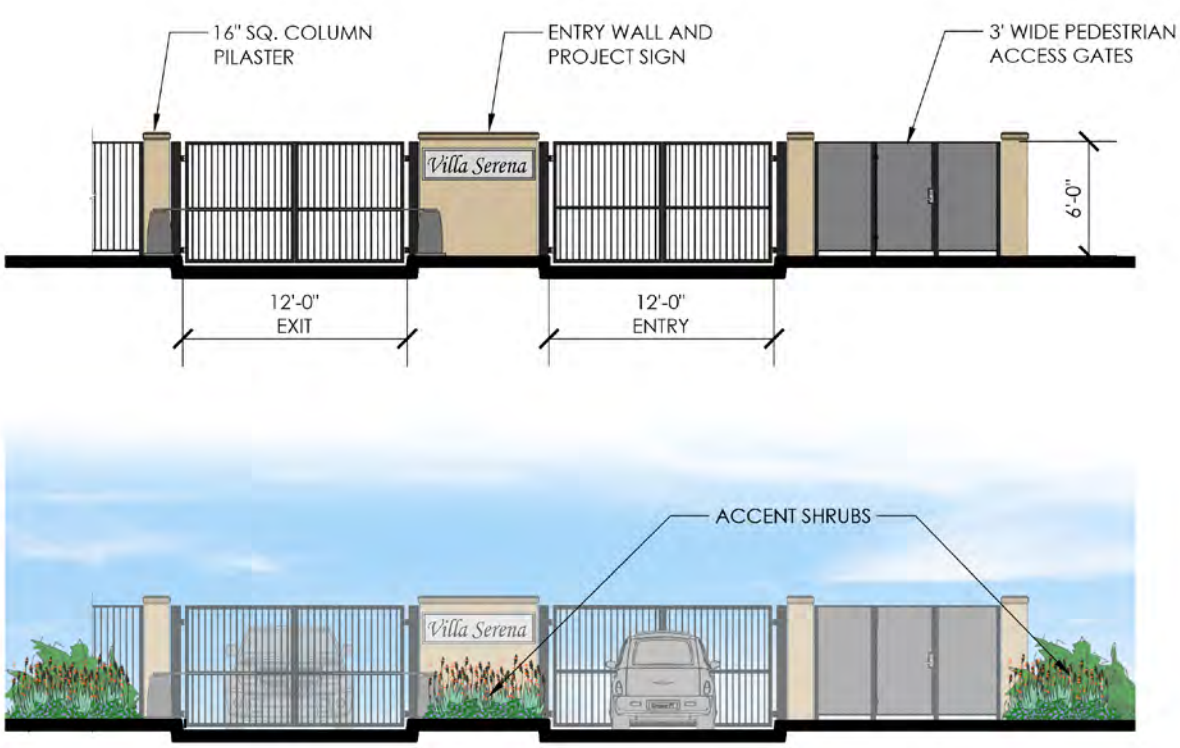



Exhibit 18

**Primary Community Entry**
**Elevation View**

*Source: Architerra Design Group*

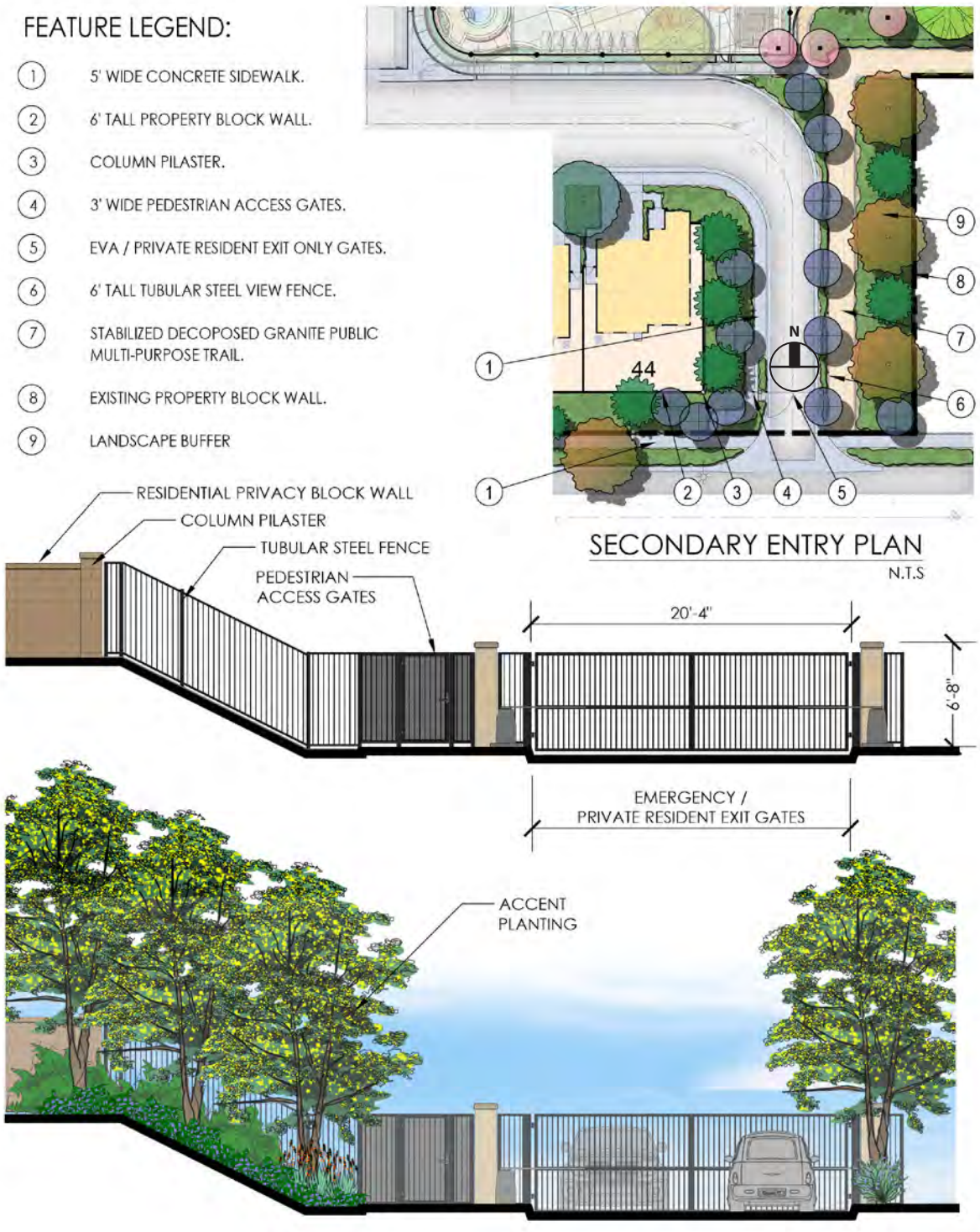



Exhibit 19
**Secondary Entry**

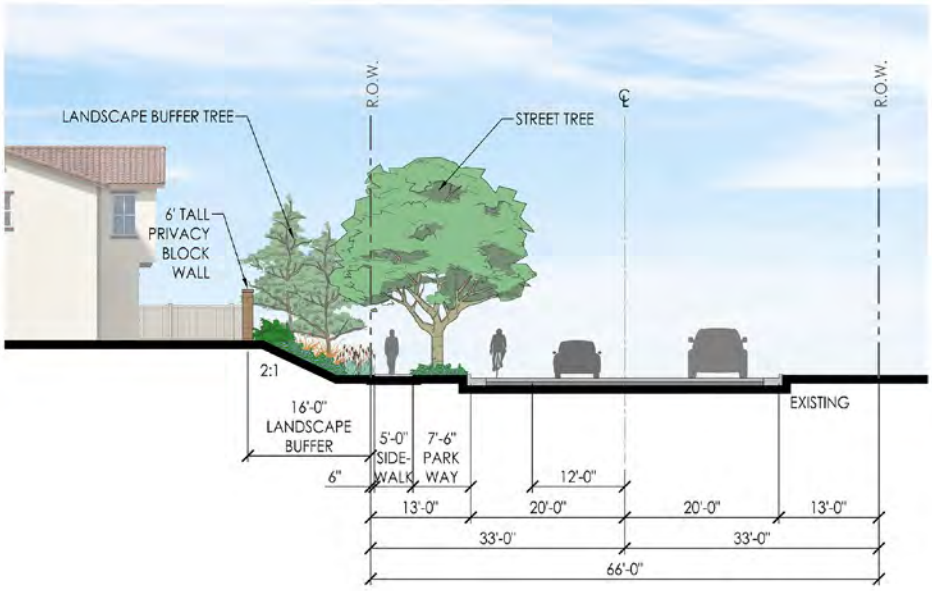
*Source: Architerra Design Group*




Exhibit 20

**Streetscape Key Map**

*Source: Architerra Design Group*



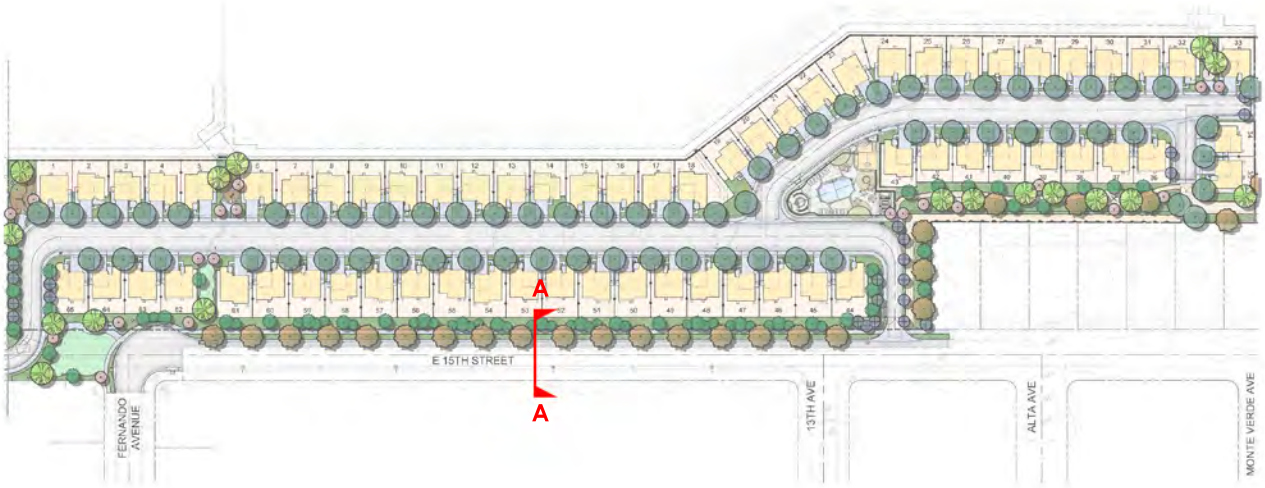




Exhibit 21

**Streetscape Sections**

*Source: Architerra Design Group*

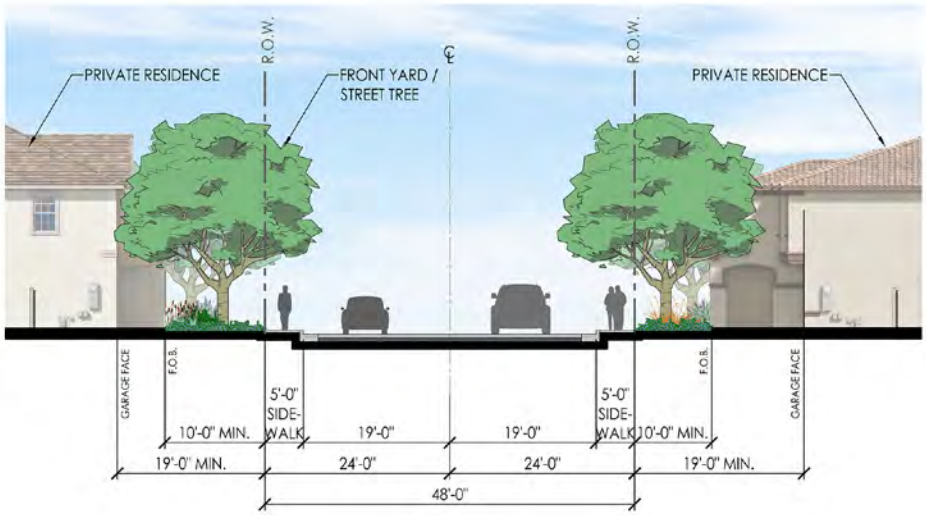
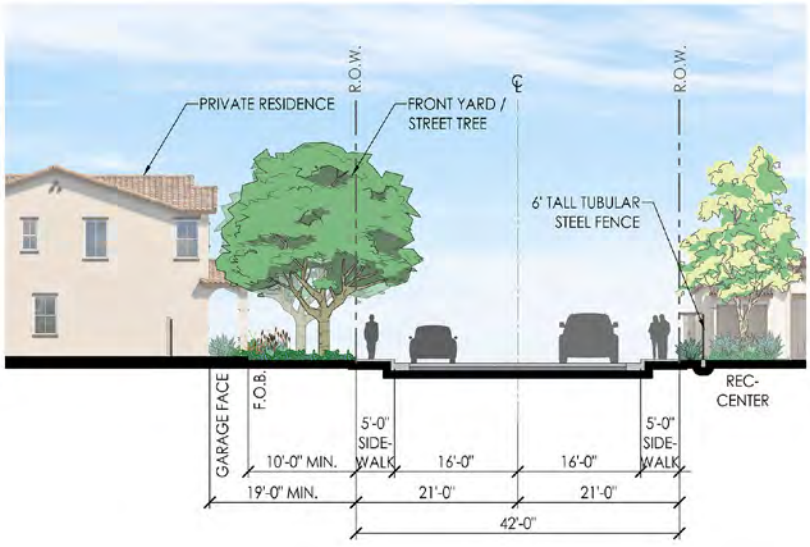






Exhibit 22
**Streetscape Sections**

*Source: Architerra Design Group*



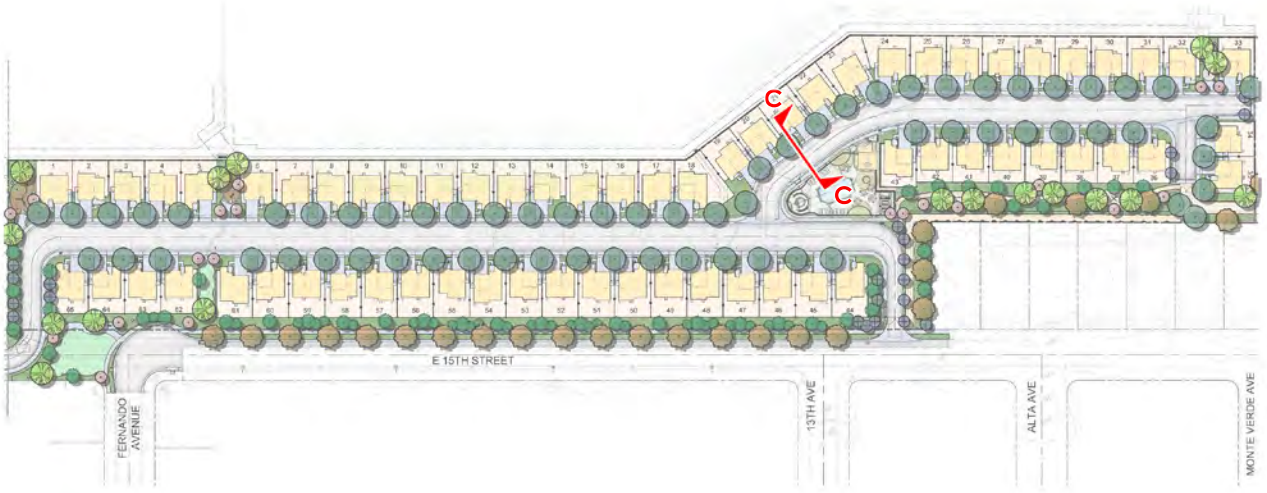




Exhibit 23

**Streetscape Sections**

*Source: Architerra Design Group*

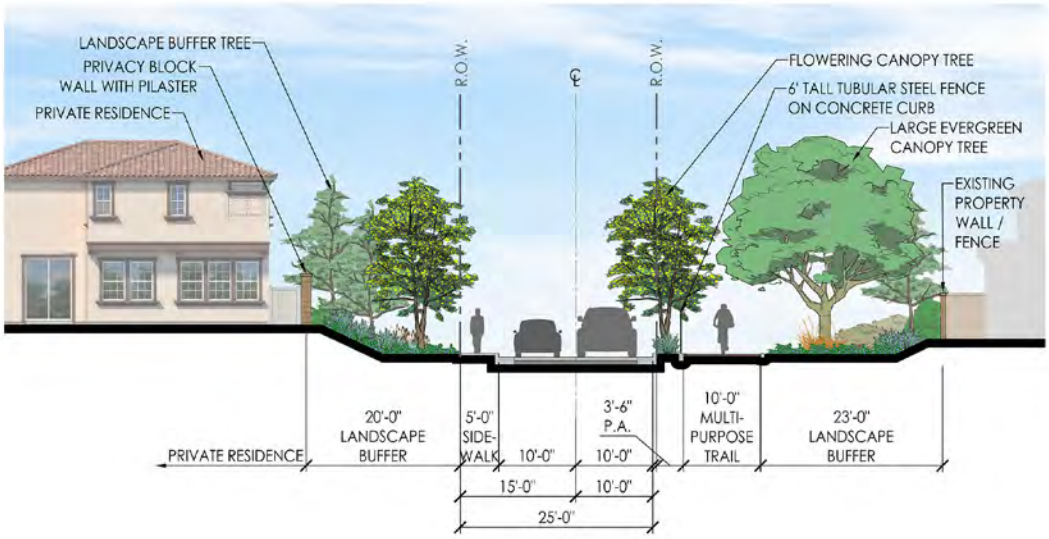






Exhibit 24
**Streetscape Sections**

*Source: Architerra Design Group*

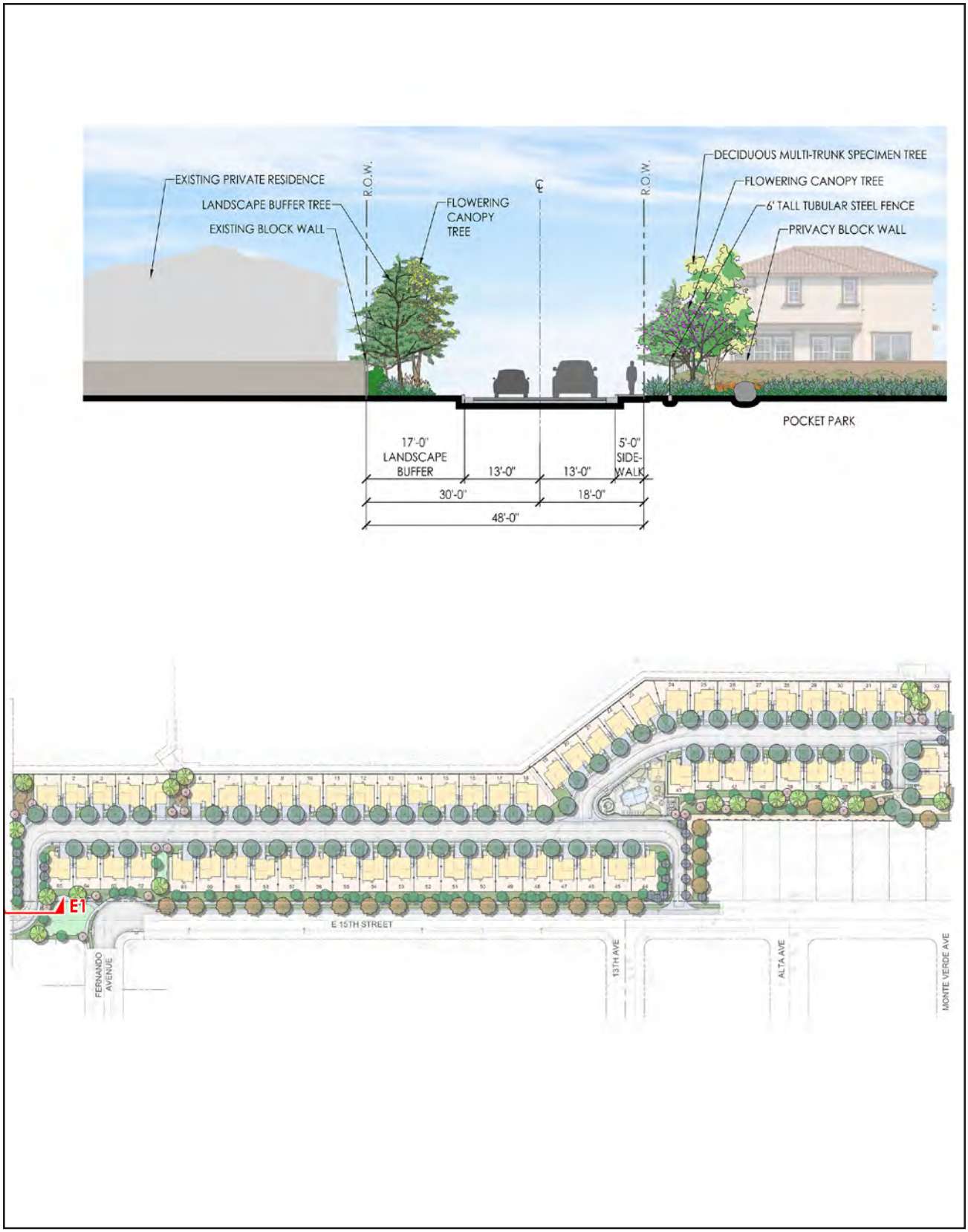



Exhibit 25
**Streetscape Sections**

*Source: Architerra Design Group*

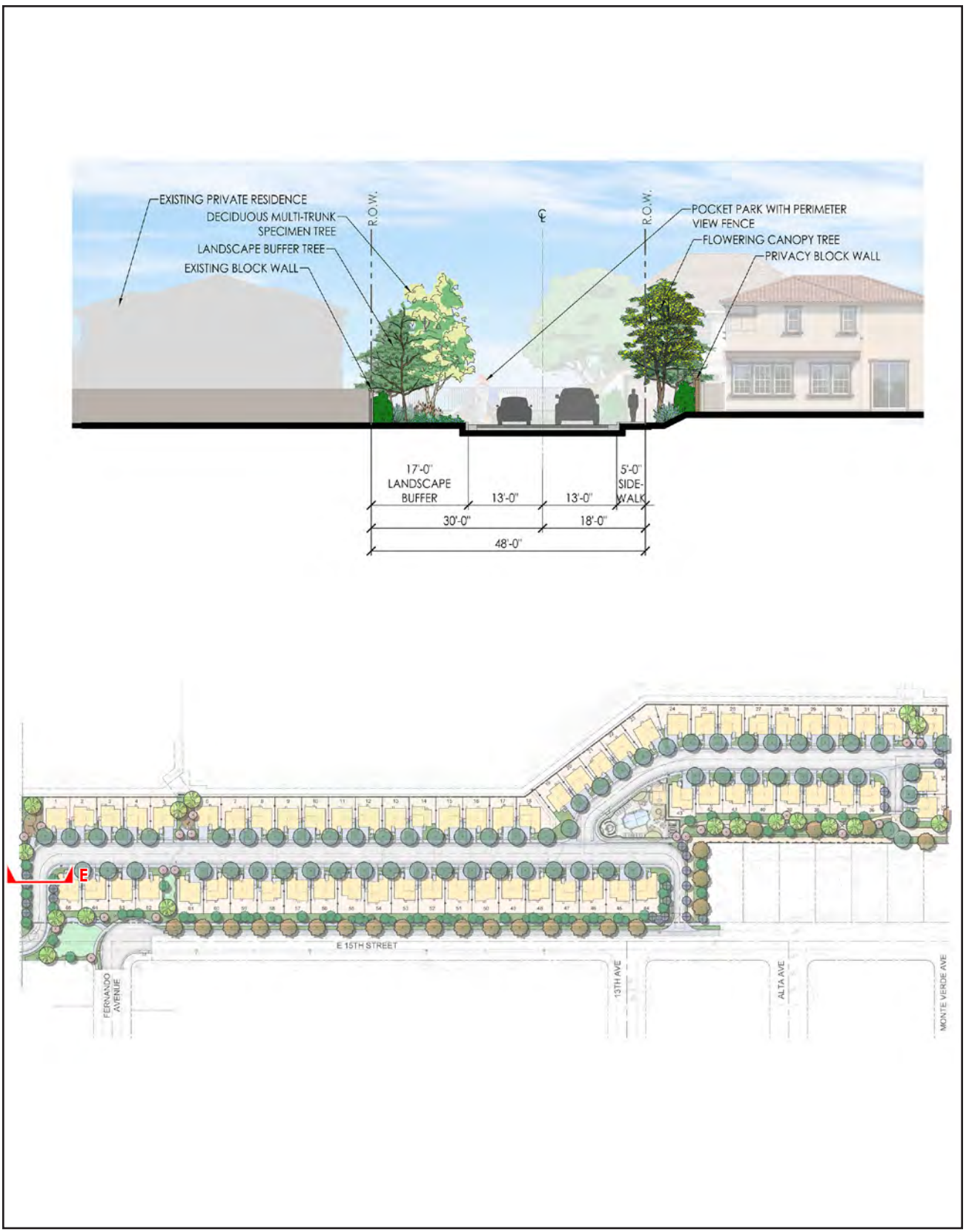
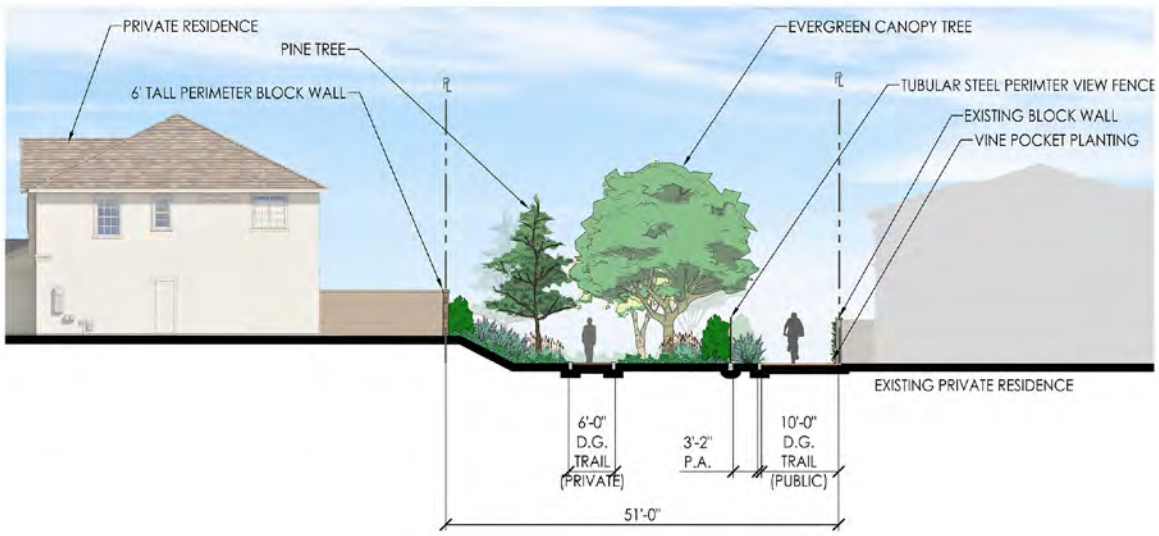



Exhibit 26
**Streetscape Sections**

*Source: Architerra Design Group*



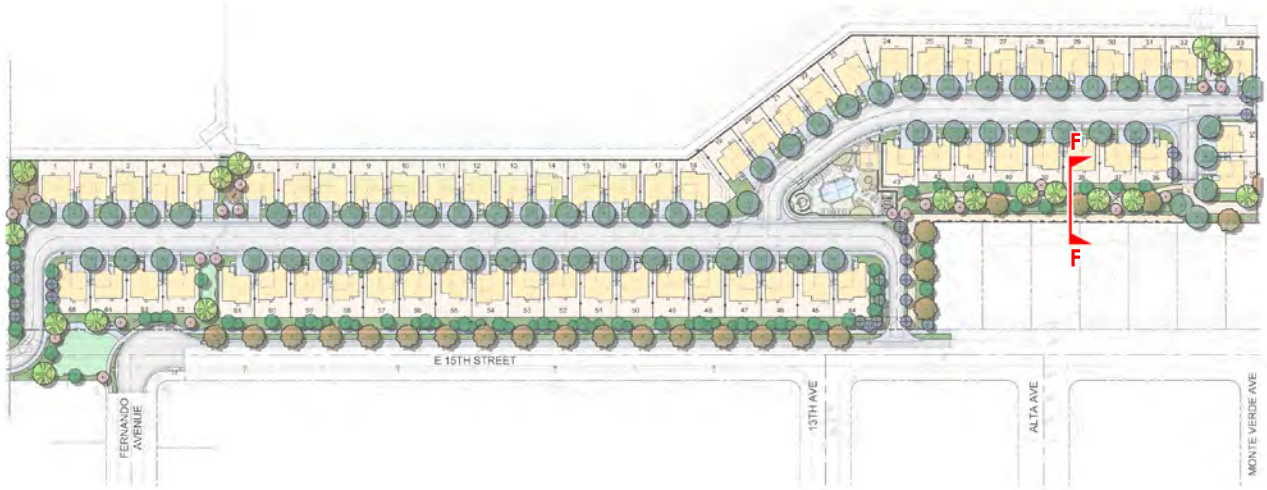




Exhibit 27

*Source: Architerra Design Group*

**Streetscape Sections**

### 4.2.4 Open Space and Connectivity

The Project will have common area open space provided for the active and passive recreational use of its residents. Walkways will lead to the areas designated for common area open space. The private on-site common area open space plan for the Project consists of the following elements:

A centrally located open space area to include the following improvements:

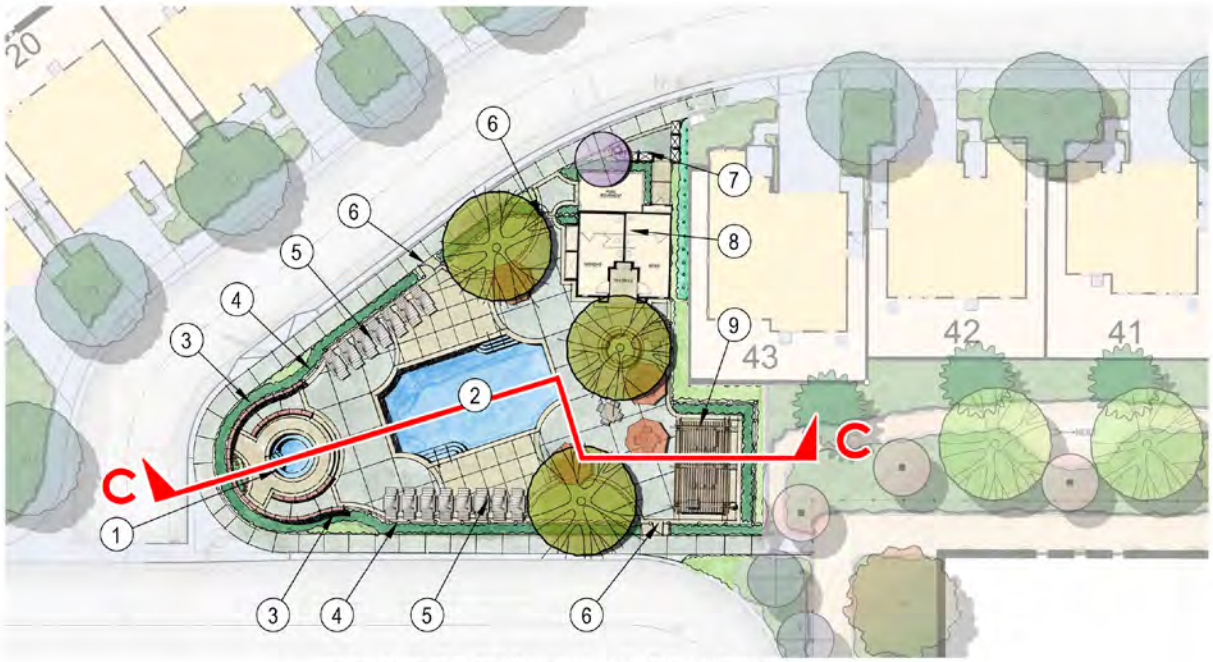
- Swimming pool and spa.
- Picnic and barbeque area with an overhead shade structure.
- Pool house with restrooms/changing areas and drinking fountains.
- Exercise station.
- Children's play area.
- Landscaped walkway connecting the active recreational area with residences.

The central open space area will also include the central mailbox location for the Project. The central open space area will be heavily landscaped with canopy trees to provide shade, shrubs, and ground cover.

Five on-site pocket parks will be provided for passive recreational use. Two pocket parks are planned at each end of the Project Site and two are planned within interior areas of the Project. The pocket parks will be heavily landscaped with canopy trees to provide shade, shrubs, and ground cover. Benches will be provided under canopy trees and each pocket park will provide children's play areas. One pocket park will also provide a putting green. One pocket park is planned as a linear park to include a private pedestrian trail and a separate public pedestrian and bicycle trail connecting to the adjacent off-site basin open space area. This park will be heavily landscaped with trees and shrubs. Bench seating will be provided along the trail.

Off-site public open space improvements to be constructed as part of the project include a pocket park adjacent to 15th Street at the south/westerly corner of the Project Site.

The central common open space and pocket parks for the Project are illustrated on Exhibit 28, “Central Open Space Plan,” Exhibits 29, and 30, "Pocket Parks." The concept for the central mailbox site within the central open space recreational area is illustrated on Exhibit 31," Central Mailbox Plan." Open space amenities such as tot lots, furnishings, and exercise stations planned for the pocket parks are illustrated in Exhibits 32-35, "Open Space Amenities."




REC-CENTER ENLARGEMENT PLAN
N.T.S

FEATURE LEGEND:

1. COMMUNITY SPA.
2. COMMUNITY SWIMMING POOL.
3. PRIVACY BLOCK WALL.
4. TUBULAR STEEL SWIMMING POOL ENCLOSURE FENCE.
5. SUNDECK.
6. SWIMMING POOL ENTRY ACCESS GATES.
7. GANG MAIL-BOX LOCATION.
8. RESTROOM FACILITY WITH POOL EQUIPMENT ROOM.

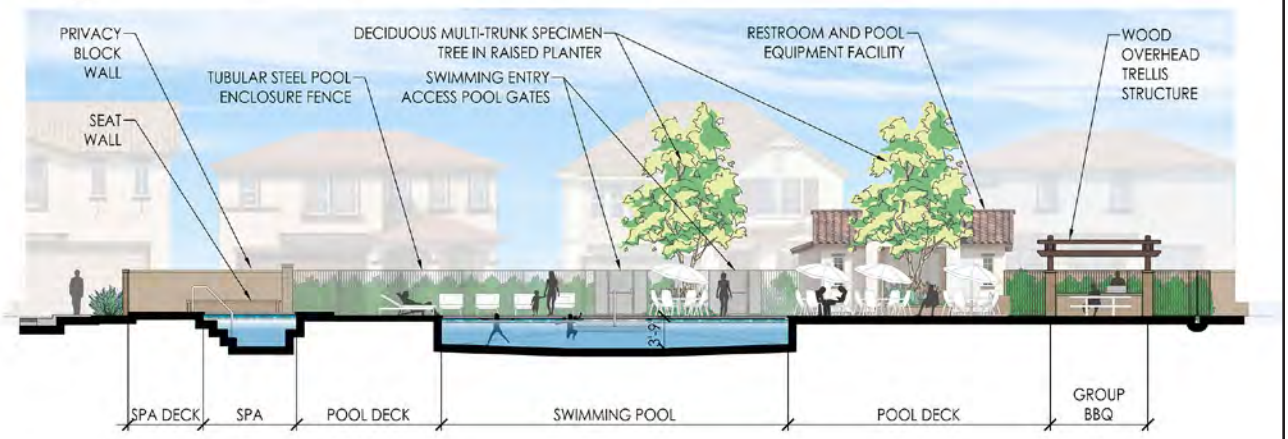



Exhibit 28
**Central Open Space Plan**

*Source: Architerra Design Group*

N

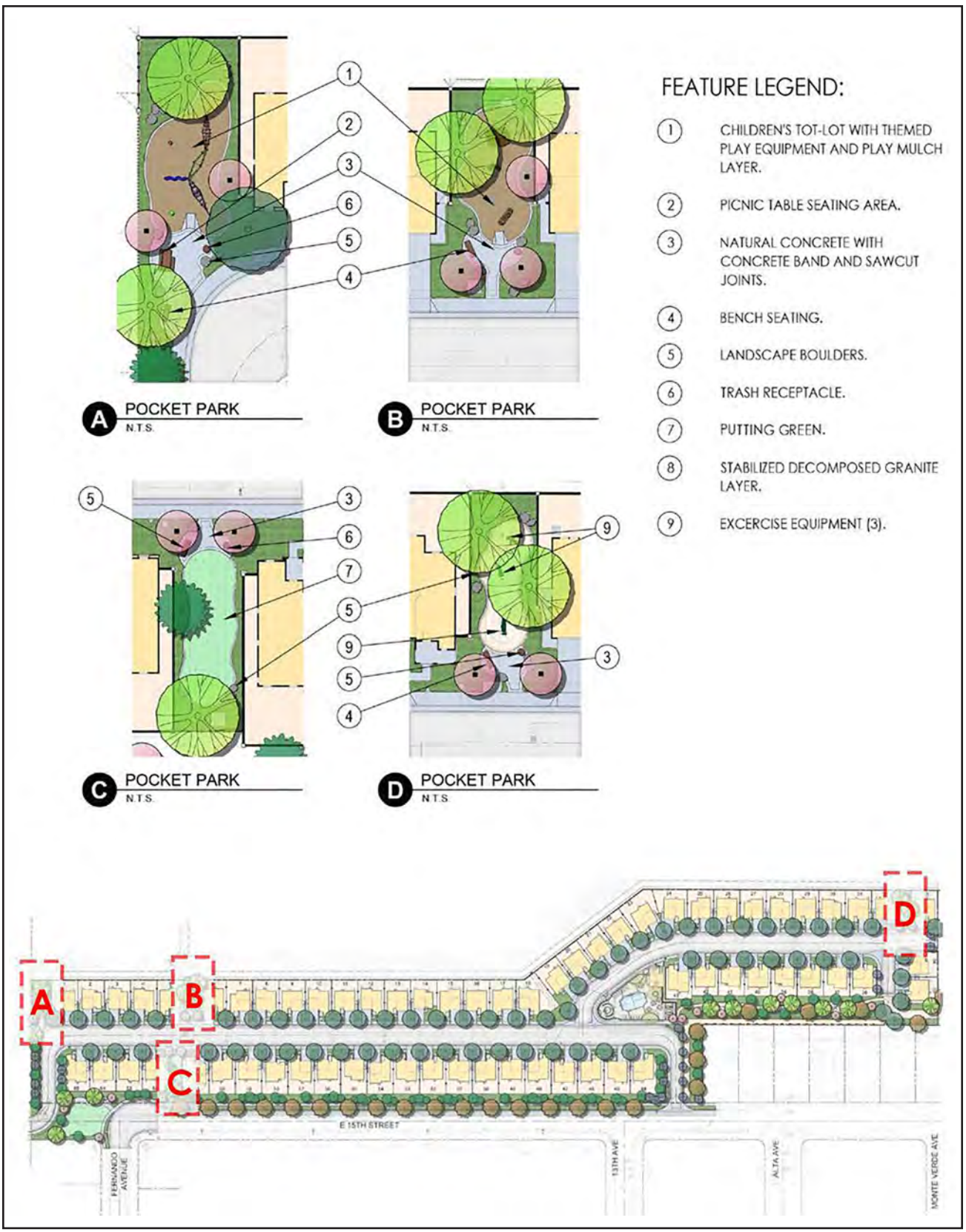
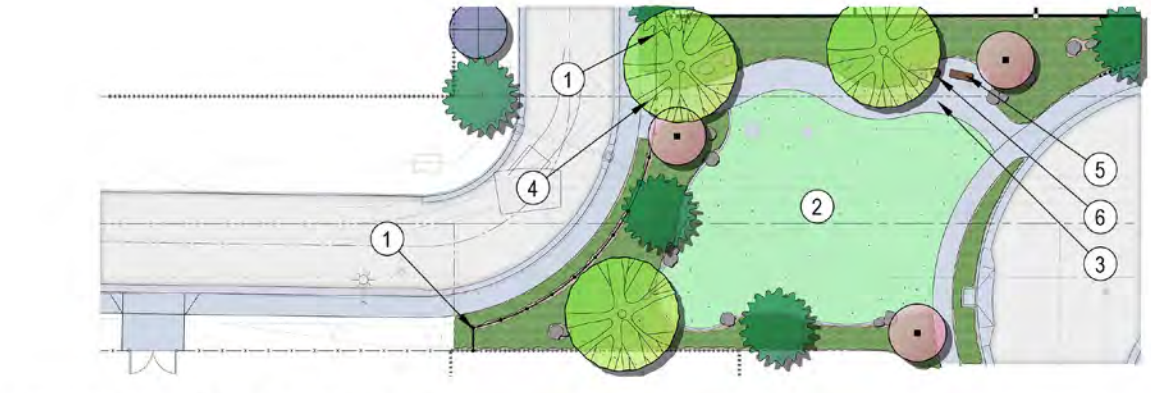
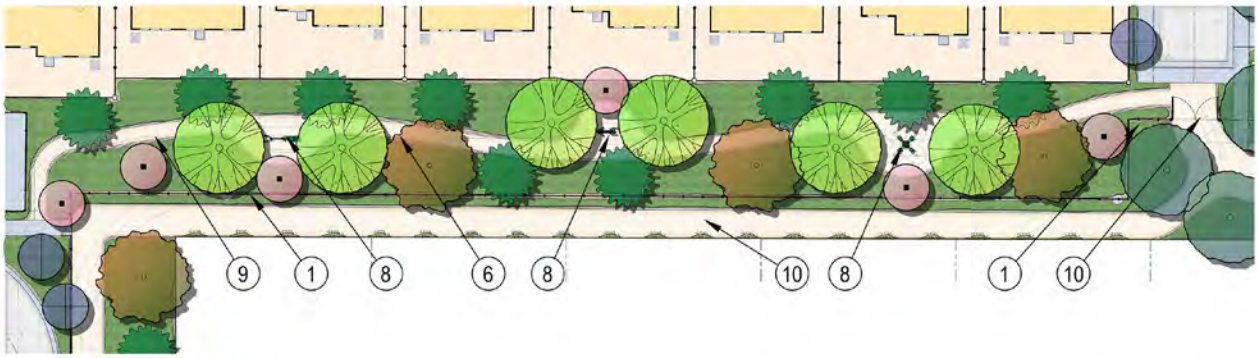



Exhibit 29
**Pocket Parks**

*Source: Architerra Design Group*




E NUCKLE POCKET PARK (PUBLIC)
N.T.S.




F POCKET PARK
N.T.S.

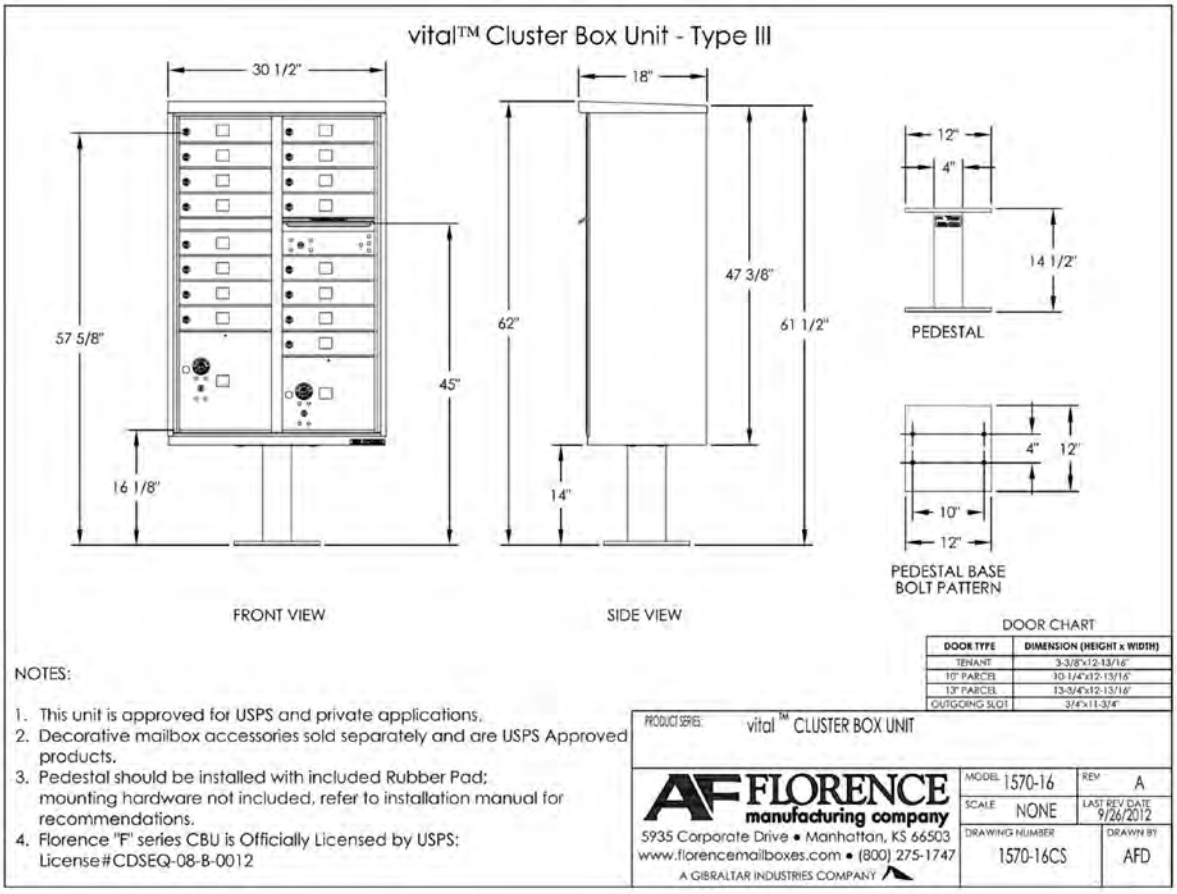
FEATURE LEGEND:

1. TUBULAR STEEL PERIMETER FENCE.
2. TURF PLAY AREA.
3. NATURAL CONCRETE PAVEMENT.
4. 3' WIDE PEDESTRIAN ACCESS GATE
5. BENCH SEATING.
6. TRASH RECEPTACLE.
7. LANDSCAPE BOULDERS.
8. EXCERCISE EQUIPMENT.
9. STABILIZED DECOMPOSED GRANITE TRAIL. (PRIVATE)
10. STABILIZED DECOMPOSED GRANITE TRAIL. (PUBLIC)
11. VEHICULAR MAINTENANCE ACCESS GATES.




Exhibit 30
**Pocket Parks**

*Source: Architerra Design Group*



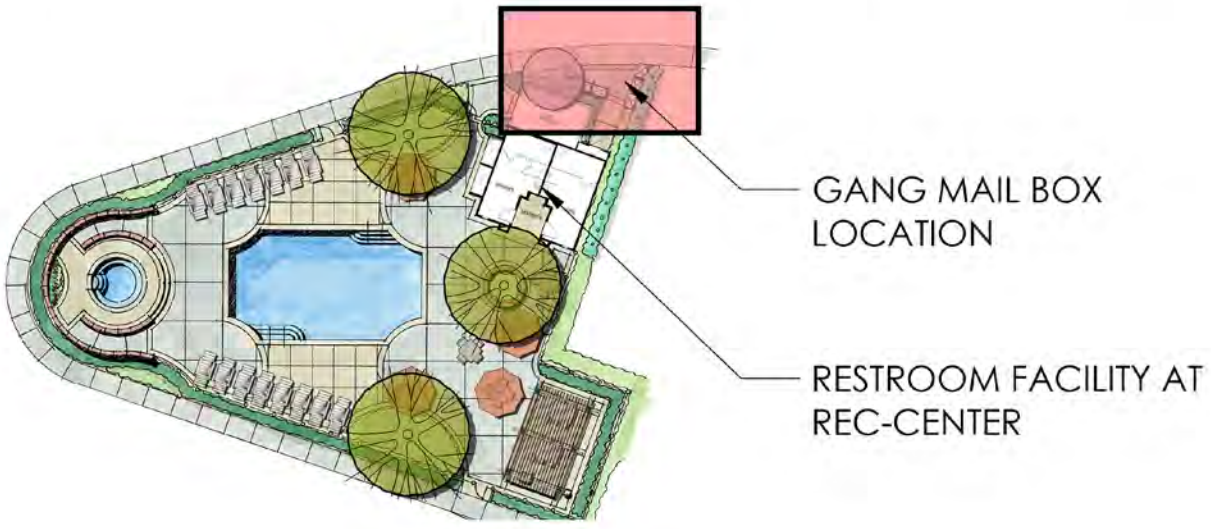




Exhibit 31
**Central Mailbox Plan**

*Source: Architerra Design Group*



TWO PERSON BACK AND ARM COMBO



THREE-PERSON STATIC COMBO



UPRIGHT BIKE



FOUR-PERSON LEG PRESS



ROWING MACHINE



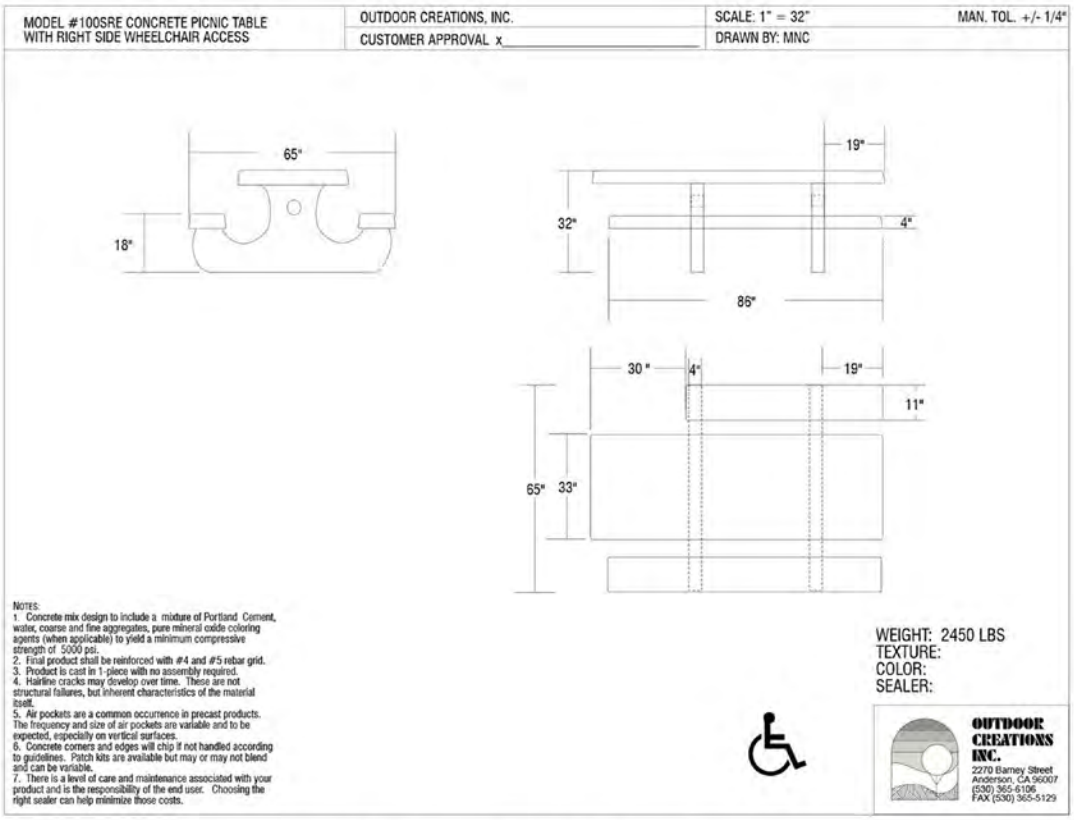
SINGLE ELLIPTICAL

COMMON AREA OPEN SPACE AMENITIES - EXERCISE STATIONS

Exhibit 32

*Source: Architerra Design Group*

**Open Space Amenities**




TYPICAL PICNIC TABLE



TRASH RECEPTACLE BENCH SEATING CONCRETE BENCH

COMMON AREA OPEN SPACE AMENITIES - FURNISHINGS

Exhibit 33
**Open Space Amenities**

*Source: Architerra Design Group*



SPINNER BOWL
BY KOMPAN



SPICA 1 (SPINNER)
BY KOMPAN



TRIPLE ROPE TRAIL
BY KOMPAN

CHILDREN'S PLAY EQUIPMENT

COMMON AREA OPEN SPACE AMENITIES - TOT LOT
N.T.S

Exhibit 34
**Open Space Amenities**

*Source: Architerra Design Group*



BEAVER HUT CONCEPT
BY UPC PARKS



NORTH AMERICAN BEAVER
BY UPC PARKS



SWIMMING BEAVER
BY UPC PARKS



BABY FLOATING FROG
BY UPC PARKS

CHILDREN'S PLAY SCULPTURES

COMMON AREA OPEN SPACE AMENITIES - TOT LOT
N.T.S

Exhibit 35
**Open Space Amenities**

*Source: Architerra Design Group*

## 4.3 Walls and Fencing

Walls and fencing are an important component of the overall landscape design of a community. Walls and fences should be designed to complement and reinforce landscape design in establishing the image and theme of the community. The type and location of Project walls and fences are described on Exhibits 36 and 37, "Wall and Fence Plan." As part of the Project ,fencing will be installed along the boundary of the existing Upland Basin trail as illustrated on Exhibit 38, "Basin Trail Fence Plan." Fence and wall details are described on Exhibit 39, "Wall and Fence Details."

### 4.3.1 Community Walls

Community walls constructed as part of the Project shall be decorative in nature. Community perimeter walls constructed as part of the Project shall be a combination of split face block and view fencing. The community entry along 15th Street and the project boundary adjacent to the linear pocket park shall have black tubular fencing constructed around these areas. Use of decorative caps and pilasters to help enhance the perimeter appeal of the walls is required. Walls and fencing within the expanded 15th Street Project access roadway shall incorporate existing residential walls and new retaining walls on the north side and existing and new chain link fencing on the south side. All perimeter walls shall be constructed within the boundaries of the Project Site.

### 4.3.2 Residential Walls and Fences

Rear yard property walls constructed as part of the Project shall be decorative split face block with accent pilasters at intervals along the wall. Vinyl fencing may be used along interior residential property lines.

### 4.3.3 Other Fences

- Tubular steel fencing is permitted to secure tot lot areas.
- Emergency vehicle access areas and the basin access gate shall be secured with tubular steel gates.

## 4.4 Outdoor Lighting

Lighting of streets, common area open space, and select landscaped areas should be considered for safety and security. Utilization of "dark sky friendly" light fixtures on local streets shall be required. Maintaining the character of traditional materials will create a pedestrian scale for the neighborhood. Lighting fixtures within the Project shall be consistent in style, color, and materials in order to maintain uniformity throughout the Project. The style for street lighting fixtures within the Project is illustrated on Exhibit 40, "Typical Street Light Fixture."

A hierarchy for all lighting within the Project shall be established by using a variety of lighting fixtures and illumination levels based lighting design intent. Lighting styles shall tie into architectural styles and provide sufficient illumination for the safety and well being of the community. Frosted, louvered, or prismatic lens should be considered where decorative lighting fixtures are visible and part of the aesthetic lighting program.

### 4.4.1 Entry Monument Lighting

Avoid intensely bright or "hot" lighting of the Primary Community Entry monument; the monument should be lit to provide a soft wash of light across the monument signage. Specimen trees at the Secondary Entry should be up-lit with several fixtures into the canopy to avoid creating dark sides of the trees.

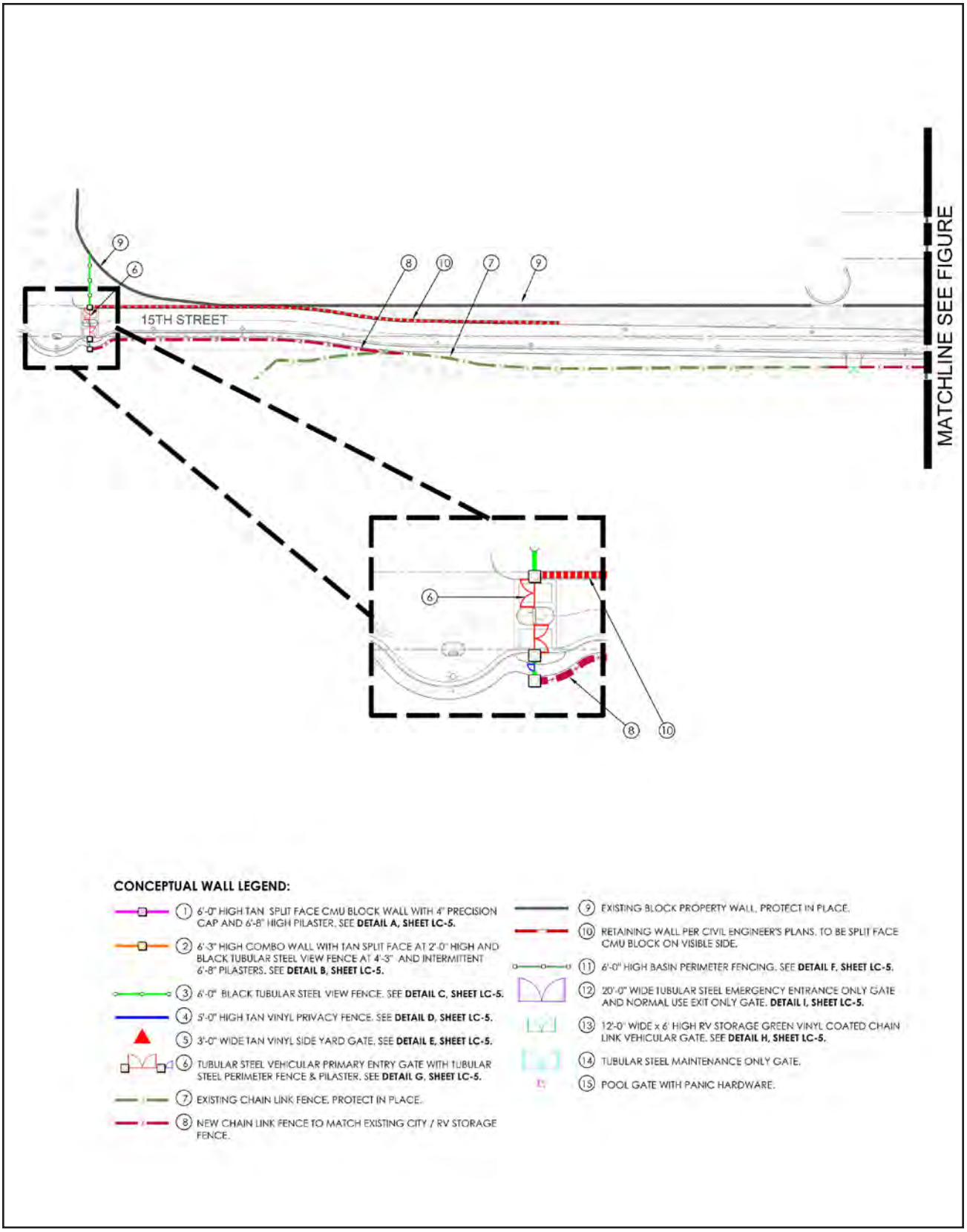



Exhibit 36

*Source: Architerra Design Group*

## Wall and Fence Plan




Exhibit 37
**Wall and Fence Plan**

*Source: Architerra Design Group*

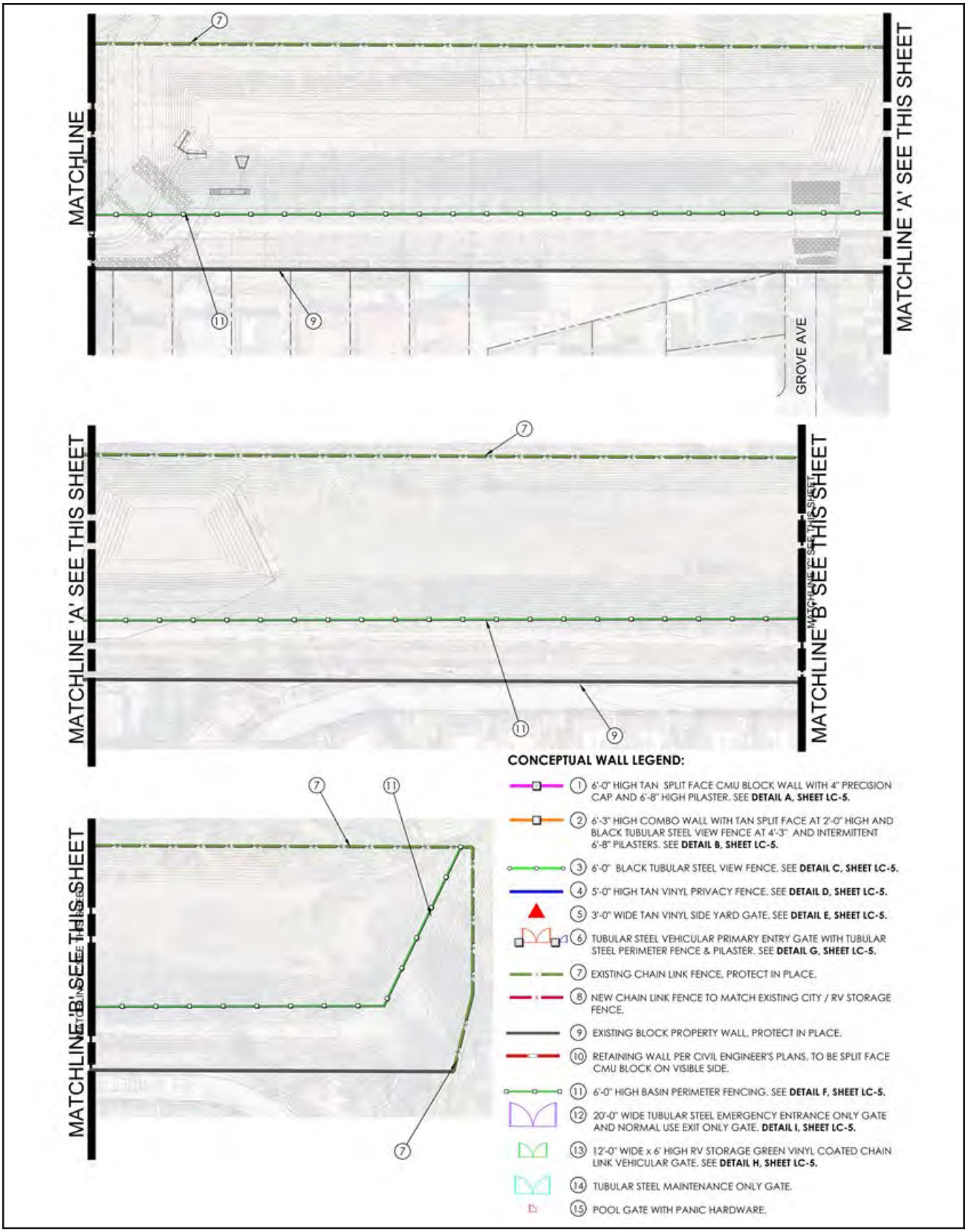



Exhibit 38

*Source: Architerra Design Group*

## Basin Trail Fence Plan

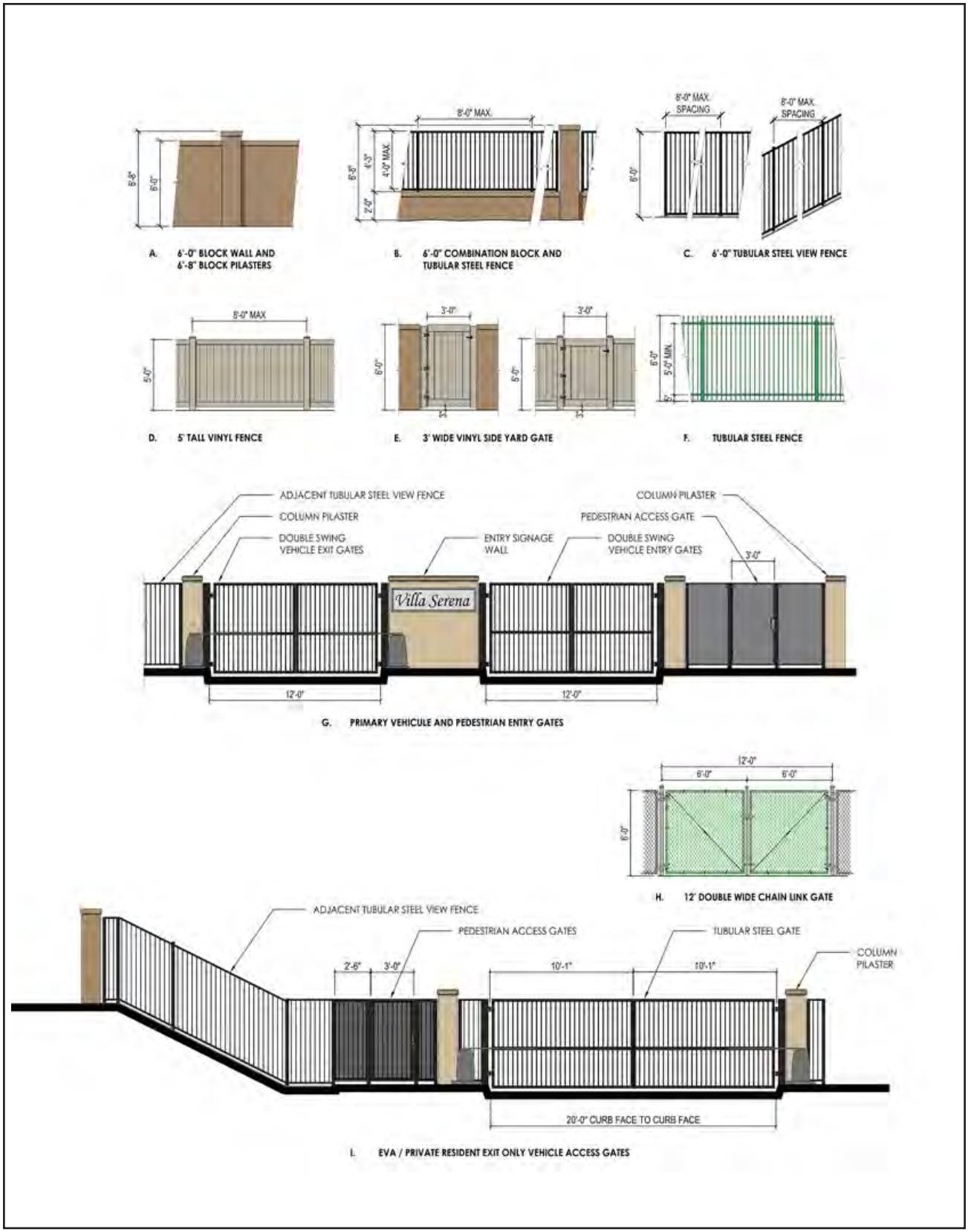



Exhibit 39

*Source: Architerra Design Group*

## Wall and Fence Details




# CHOOSING THE RIGHT LIGHTING PROFILE

**FIRST LIGHT TECHNOLOGIES SOLAR LED LUMINAIRES**

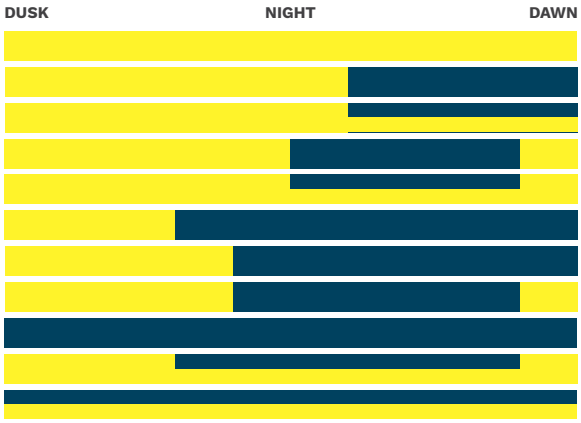
A lighting profile determines when your light will be on and how bright it will be through the night. For First Light products, there are two types of lighting profiles – duration based lighting profiles and real-time based lighting profiles.

**WHAT ARE DURATION BASED LIGHTING PROFILES?**

Duration based profiles are based on when lights detect dusk and dawn. We offer several options to provide full brightness and dimming for fixed durations during the night. Note that there is no additional set up required at time of install.

## DURATION BASED LIGHTING PROFILES

| Order Key Codes | |
|---|---|
| 00 | On at dusk > off at dawn |
| 01 | On at dusk > off after 6 hours |
| 02 | On at dusk > after 6 hours dim to 30% > off at dawn |
| 03 | On at dusk > off after for 5 hours > on 1 hour before dawn > off at dawn |
| 04 | On at dusk > dim to 30% after 5 hours > brighten to 100% 1 hour before dawn > off at dawn |
| 05 | On at dusk > off after 3 hours |
| 06 | On at dusk > off after 4 hours |
| 07 | On at dusk > off after 4 hours > on 1 hour before dawn > off at dawn |
| 08 | Off (with motion sensing) |
| 09 | On at dusk > after 3 hours dim to 30% > brighten to 100% 1 hour before dawn > off at dawn |
| 10 | On 30% at dusk > off at dawn |




FIRSTLIGHT TECHNOLOGIES

info@firstlighttechnologies.com / 1-844-279-8754

Exhibit 40
**Typical Street Light Fixture**

*Source: Visual Concepts Lighting, Inc.*

### 4.4.2 Open Space Areas and Walkway Lighting

Lighting of the walkways within open space areas should be considered for safety and security. Security lighting fixtures shall be vandal resistant, not less than (8) eight feet from ground level. Low level pedestrian lighting along walkways within open space areas should be provided to create a better sense of scale to the pedestrian. Luminaries of not less than 42" in height may be utilized to illuminate a walkway if adjacent landscaping is of a variety that does not mature higher than two feet.

## 4.5 Signs

All signs within the Project shall conform to a sign program submitted by the applicant and approved by the City. The sign program shall serve to reinforce the overall design theme for the community and to promote an overall "sense of place" through architecturally integrated, visually coordinated, and aesthetically balanced sign design. As part of the sign program the design of all sign graphics shall be carefully considered in relation to the site architecture and landscaping, as well as to the specific content of the area. Conformity of design among all signs is required.

### 4.5.1 Sign Program Objectives

Signs within the Project shall address the following objectives:

- Provide a project identity through elements that convey a distinct community character enhancing the collective architectural theme.
- Provide for a hierarchy of signs to address Project identity, directions and information within the community, and identify the common area open space and Project amenities.
- Ensure the efficient circulation of vehicle traffic within the Project Site.
- Enhance the pedestrian and biking experience through attractive and comprehensible way-finding signage and destination identifiers.

### 4.5.2 Sign Design Criteria

The following design criteria shall be considered for Project signs:

- Signs shall be of uniform design relative to each other, sharing similar colors, materials, and shapes.
- Signs shall be color compatible with building architecture and landscape features on the site.
- Materials shall include the use of real veneer materials instead of faux concrete veneers.

## 4.6 Architectural Design

The architecture represented in the Project shall be comprised of rich, traditional styles that complement one another and serve to reinforce diversity in the community street scene. Three separate and distinct architectural styles influenced by thematic architecture found within California have been selected for the Project. Each style is presented on the following pages describing the characteristics that begin to express the anticipated architectural character for the community. These styles are influenced and inspired by the themes of each style, all represented in historical California architecture. Other architectural styles may be approved for the Project by the City as part of Development Plan Review. Other styles should exhibit compatibility to the three styles described below.

### 4.6.1 Spanish Influenced Style

The Spanish style is an adaptation of the Mission Revival style, reflecting features such as strong form and mass, plain stucco wall surfaces, and tile roofs. The front elevations are very simply articulated and detailed. Further architectural distinction is established through the use of heavily textured wooden doors, colorful decorative ceramic tile accents and robust ornamental ironwork. The charm of the Spanish style lies in the directness, adaptability and contrast of materials and textures.

The following elements define the Spanish architectural style for the Project.

**Massing:**

- Simple massing and forms with varied roof forms.

**General Materials:**

- Stucco finished walls.
- Rounded stucco arches.
- Wrought iron accents.
- Thick walls.
- Deep recessed openings.
- Clay pipe details at gable ends.

**Roof Materials and Forms:**

- Low-pitched roofs.
- Minimal overhangs.
- Gable main roof with intersecting gables.
- Concrete 'S' tiles.

**Detail Elements:**

- Arched window/door openings.
- Decorative columns and trim.
- Recessed windows.
- Decorative plank shutters.
- Window trims at top and bottom.
- Decorative corbels and roof finials.
- Wrought iron details.
- Vertically proportioned windows.
- Decorative flared walls.
- 16-panel garage door

The characteristics of the Spanish architectural style are illustrated on Exhibit 41, "Spanish Style."

| ROOF / GARAGE DOOR STYLES | ARCHITECTURAL DETAILS | DESCRIPTION |
|---|---|---|
|   |  | • Concrete 'S' Tile Roofing<br>• Arched Openings<br>• Flared Wing Walls<br>• Shaped Stucco Corbels<br>• Decorative Finials<br>• Deep Recessed Windows<br>• Wrought Iron Pot Shelves<br>• Decorative Clay Pipes<br>• Decorative Plank Shutters<br>• 8' Tall Sectional 16-Panel Garage Doors<br>• 8' Tall Decorative Plank Entry Doors |

Exhibit 41
**Spanish Style**

*Source: KB Home*

### 4.6.2 Italianate Influences

The Italianate style as interpreted and conceived by Southern California architects of the early 20th century adapted the grand formal elegance of the Italian Renaissance estate with a localized approach to detailing and scale. Composed primarily of stacked two-story forms, the front elevations of these homes display a distinct organization of windows and doors, often with a centrally located, articulated entry. Key identifying features of this style include low-pitched hip roofs and rich architectural detailing including decorative cornice brackets, enhanced horizontal banding, and arched elements.

The following elements define the Italianate architectural style for the Project.

**Massing:**

- Stacked two-story massing.

**General Materials:**

- Stucco finished walls.
- Porches with arched openings.
- Color blocking for added visual interest.
- Corbels at soffits and eaves elements.
- Stucco belly bands.

**Roof Materials and Forms:**

- Low-pitched roofs.
- Hip roofs typical.
- Minimal overhangs.
- Concrete 'S' tiles.

**Detail Elements:**

- Mullions in vertical patterns.
- Window trims at top, bottom, and sides.
- Paired window groupings.
- Decorative louvered shutter.
- Solid eaves at select locations.
- Decorative belly bands.
- Wide corbels at eaves.
- Decorative pot shelves.
- Simulated precast surround at entries.
- Built-up eaves.
- 32-panel garage door.

The characteristics of the Italianate architectural style are illustrated on Exhibits 42, "Italianate Style."

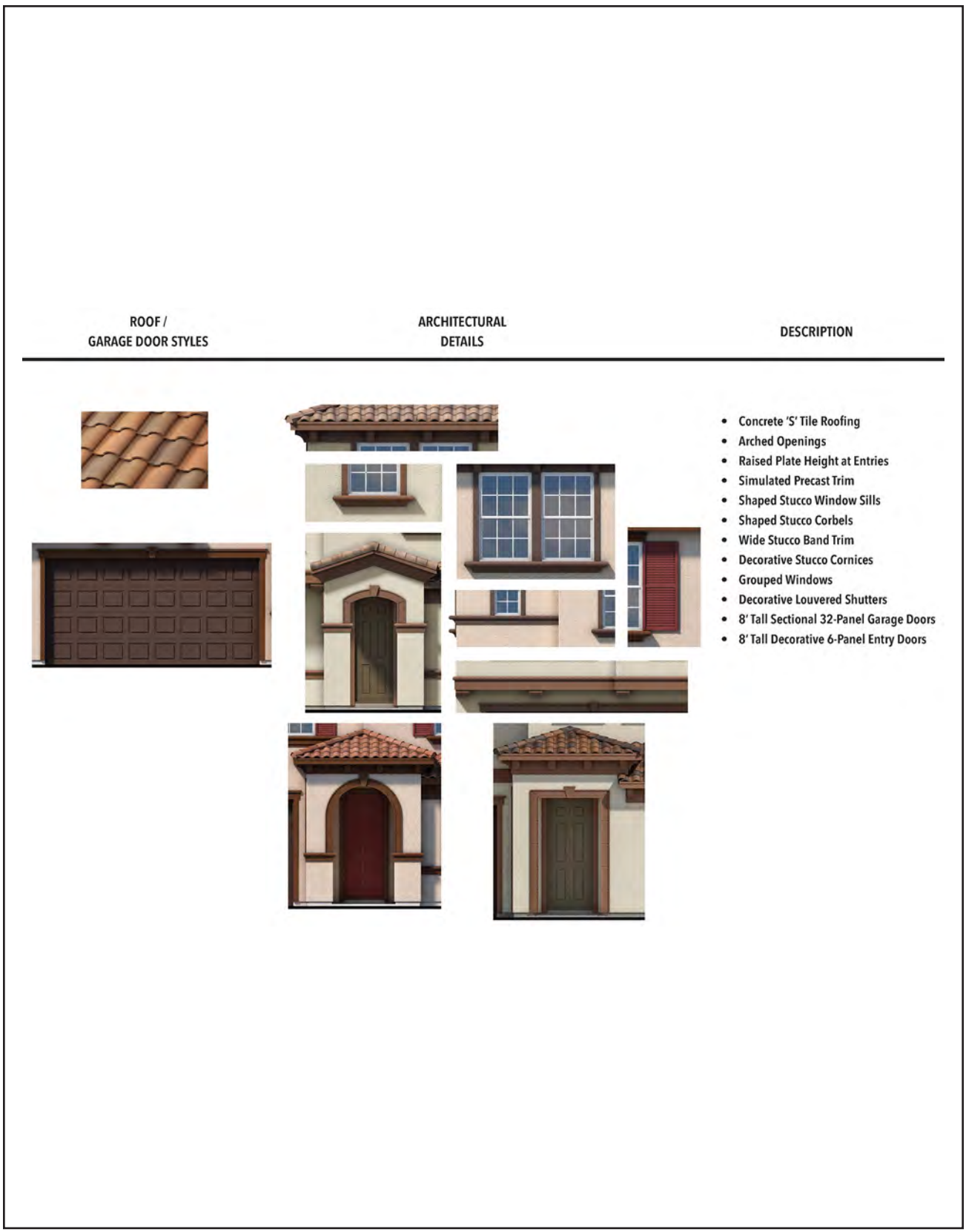



Exhibit 42
**Italianate Style**

*Source: KB Home*

### 4.6.3 French Country Influences

The French Country style is based upon early American interpretations of French Medieval architecture that made its way across the United States from the Mississippi regions around the turn of the century. Usually taking the form of larger manor homes and estates, this architectural style was adapted to fit smaller informal rural homes. Popular in fairy tale illustrations, the French Country style conveys a romantic and picturesque architecture replicating the cottages that dot the rustic French countryside. American interpretations include simple, asymmetrical forms with steeply-pitched roofs.

**Massing:**

- Simple massing with asymmetrical forms and gable roofs.

**General Materials:**

- Stucco finished walls.
- Vertical windows.
- Simple detailing.

**Roof Materials and Forms:**

- Steep roof forms with multiple pitches.
- Gable and hip roof forms.
- Large, simple roof planes.
- Gable end venting in various styles.
- Extended roof overhangs.
- Flat concrete tile to simulate shake materials.

**Detail Elements:**

- Decorative Z-plank shutters.
- Wood porch columns with decorative brackets.
- Box bay windows.
- Grouped windows.
- Multi-paned windows.
- Window trims at top, bottom and sides.
- Arched openings.
- 16-panel garage door with decorative vertical slats.

The characteristics of the French Country architectural style are illustrated on Exhibits 43, "French Country Style."

| ROOF / GARAGE DOOR STYLES | ARCHITECTURAL DETAILS | DESCRIPTION |
|---|---|---|
|  |  | • Concrete Shake Tile Roofing<br>• Soft Arched Openings<br>• Shaped Corbels<br>• Box Bay Windows w/ Wood Paneling<br>• Wood Trellises w/ Decorative Kickers<br>• Wide Stucco Band Trim<br>• Decorative Triangular Gable Vents<br>• Wood Posts with Decorative Brackets<br>• Decorative Z-Plank Shutters<br>• 8' Tall Sectional 32-Panel Garage Doors w/ Decorative Slats<br>• 8' Tall Decorative Arched Plank Entry Doors |
| |  | |

Exhibit 43

**French Country Style**

*Source: KB Home*

### 4.6.4 Architectural Enhancements

Where building elevations front onto the adjacent golf course and along certain portions of 15th Street these elevations will be enhanced with special architectural features consistent with the architectural style of the building. Examples of these special enhancements include, but are not limited to:

- Decorative foam shutters around master bedroom and/or master bath windows.
- Additional window with decorative wrought iron pot shelf at master closet.
- Decorative stucco over foam shaped corbels at the sides of the gable at the master bedroom and/or master bath.
- Pop out wall with a gable or hip roof with stucco over foam shaped corbels at the sides of the gable at the master bedroom.
- Decorative clay pipes at the added gable end.
- Stucco over foam shaped corbels with sand finish under the cantilever at the master bath or bedroom.
- Decorative foam shutters at the master bedroom or bath windows.
- Stucco over foam trim band along the entire elevation.
- Additional window with decorative foam shutters at master closet.
- Stucco over foam trim band along the entire elevation.

The locations of architecturally enhanced elevations are identified on Exhibit 44, “Architectural Enhancements Key Map.” Typical enhancements for each architectural style are illustrated on Exhibit 45, “Enhanced Elevation Spanish Style,” Exhibit 46, “Enhanced Elevation French Country Style,” and Exhibit 47, “Enhanced Elevation, Italianate Style.”

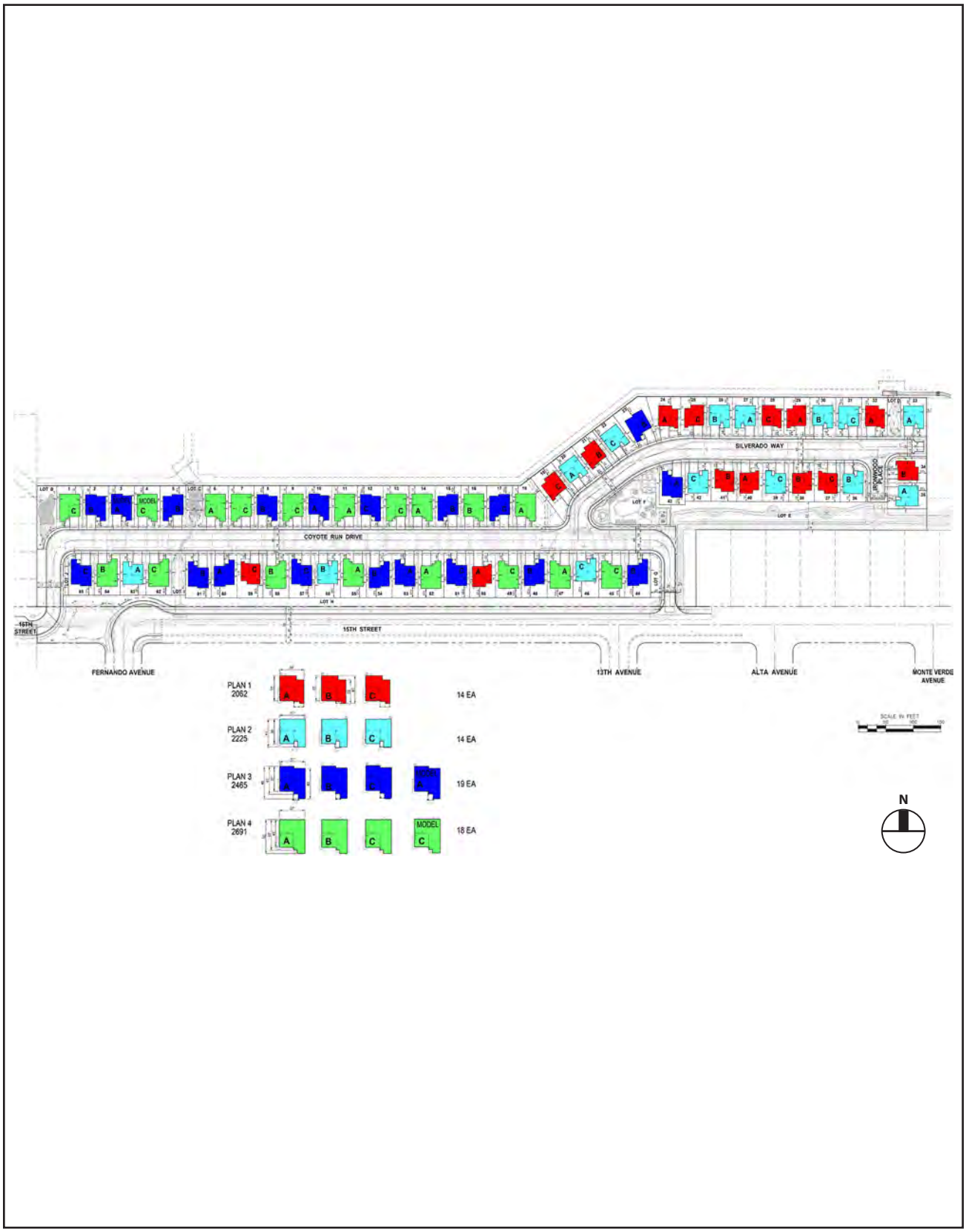



Exhibit 44

*Source: KB Home*

**Architectural Enhancements Key Map**




Exhibit 45

**Enhanced Elevation Spanish Style**

*Source: KB Home*




Exhibit 46

*Source: KB Home*

**Enhanced Elevation French Country Style**




Exhibit 47

**Enhanced Elevation Italianate Style**

*Source: KB Home*

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# APPENDIX C

# AIR QUALITY-GREENHOUSE GAS ASSESSMENT

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MEMORANDUM

URBAN CROSSROADS

**DATE:** September 30, 2024
**TO:** Robert D. Dalquest, Development Services Director
**FROM:** Haseeb Qureshi
Ali Dadabhoy
**JOB NO:** 14896-04 AQ & GHG Assesment

## VILLA SERENA SPECIFIC PLAN AIR QUALITY & GREENHOUSE GAS ASSESSMENT

Robert D. Dalquest,

Urban Crossroads, Inc. is pleased to provide the following Air Quality & Greenhouse Gas Assessment for the Villa Serena Specific Plan (**Project**), which is located on the northeast corner of Fernando Avenue and 15th Street in the City of Upland.

## PROJECT OVERVIEW

The Project is proposed to consist of the development of 65 single family detached residential dwelling units, the 15th Street extension and the basin trail. The proposed Project is anticipated to have an opening year of 2025. The Project's Tentative Tract Map is shown as Exhibit 1.

## SUMMARY OF FINDINGS

Results of the assessment indicate that the Project would result in a less than significant with respect to air quality and greenhouse gases.

**EXHIBIT 1: PROJECT'S TENTATIVE TRACT MAP**




## PROJECT AIR QUALITY IMPACTS

## AIR QUALITY SETTING

### SOUTH COAST AIR BASIN (SCAB)

The Project site is located in the SCAB within the jurisdiction of South Coast Air Quality Management District (SCAQMD) (3). The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As previously stated, the Project site is located within the SCAB, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County.

The SCAB is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bounded by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

***Regional Climate***

The regional climate has a substantial influence on air quality in the SCAB. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the SCAB vary from the low to middle 60s degrees Fahrenheit (°F). Due to a decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of sulfur dioxide (SO2) to sulfates (SO4) is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the SCAB is 71 percent (%) along the coast and 59% inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90% of the SCAB's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the SCAB with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the SCAB. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14½ hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the SCAB is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the SCAB is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the SCAB, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire SCAB. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as nitrogen oxides (NOX) and carbon monoxide (CO) from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

***Wind Patterns and Project Location***

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The SCAB is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

***Criteria Pollutants***

Both the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants representing safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The six criteria pollutants are ozone ($O_3$) (precursor emissions include $NO_X$ and reactive organic gases (ROG), CO, particulate matter (PM), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. The Riverside County portion of the SCAB is designated as a nonattainment area for the federal $O_3$ and $PM_{2.5}$ standards and is also a nonattainment area for the state standards for $O_3$, $PM_{10}$, and $PM_{2.5}$.

***Sensitive Receptor Locations***

Some people are especially sensitive to air pollution and are given special consideration when evaluating air quality impacts from projects. These groups of people include children, the elderly, and individuals with pre-existing respiratory or cardiovascular illness. Structures that house these persons or places where they gather are defined as "sensitive receptors". These structures typically include uses such as residences, hotels, and hospitals where an individual can remain for 24 hours. Consistent with the LST Methodology, the nearest land use where an individual could remain for 24 hours to the Project site has been used to determine construction and operational air quality impacts for emissions of $PM_{10}$ and $PM_{2.5}$, since $PM_{10}$ and $PM_{2.5}$ thresholds are based on a 24-hour averaging time.

Receptors in the Project study area are described below. All distances are measured from the Project site boundary to the outdoor living areas (e.g., backyards) or at the building façade, whichever is closer to the Project site. Receptors in the Project study area are shown on Exhibit 2 under the Localized Construction Emissions section later in the report.

- Receptor R1 represents the existing residence at 1168 Upland Hills Dr S, approximately 187 feet north of the Project site.
- Receptor R2 represents the existing residence at 1246 Upland Hills Dr S, approximately 144 feet north of the Project site.
- Receptor R3 represents the existing residence at 1442 Upland Hills Dr S, approximately 179 feet north of the Project site.
- Receptor R4 represents the existing residence at 1512 Grove Ave, approximately 51 feet south of the Project site.
- Receptor R5 represents the existing residence at 1377 E 15$^{th}$ St, approximately 27 feet south of the Project site.
- Receptor R6 represents the existing residence at 1345 E 15$^{th}$ St, approximately 17 feet south of the Project site.
- Receptor R7 represents the existing residence at 1496 Carlos Way, approximately 59 feet south of the Project site.
- Receptor R8 represents the existing residence at 1497 Fernando Ave, approximately 28 feet south of the Project site.
- Receptor R9 represents the existing residence at 1030 Sawtooth Dr, approximately 29 feet north of the Project site.
- Receptor R10 represents the existing residence at 1540 N Himalayas Cir, approximately 12 feet northwest of the Project site.

# REGULATORY BACKGROUND

## FEDERAL REGULATIONS

The EPA is responsible for setting and enforcing the national ambient air quality standards (NAAQS) for $O_3$, CO, $NO_X$, $SO_2$, $PM_{10}$, and lead (Pb) (5). The EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal air quality standards, the NAAQS, and specifies future dates for achieving compliance (6). The CAA also mandates that each state submit and implement state implementation plans (SIPs) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions) (7) (8). Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants $O_3$, $NO_2$, $SO_2$, $PM_{10}$, CO, $PM_{2.5}$, and Pb. The NAAQS were amended in July 1997 to include an additional standard for $O_3$ and to adopt a NAAQS for $PM_{2.5}$.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and $NO_X$. $NO_X$ is a collective term that includes all forms of $NO_X$ which are emitted as byproducts of the combustion process.

## CALIFORNIA REGULATIONS

### CARB

The CARB, which became part of the California EPA (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. AB 2595 mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the California ambient air quality standards (CAAQS) for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for $SO_4$, visibility, hydrogen sulfide ($H_2S$), and vinyl chloride ($C_2H_3Cl$). However, at this time, $H_2S$ and $C_2H_3Cl$ are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS (1) (2).

Local air quality management districts, such as the SCAQMD, regulate air emissions from stationary sources such as commercial and industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Serious non-attainment areas are required to prepare Air Quality Management Plans (AQMP) that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);
- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;
- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a 5% or more annual reduction in emissions or 15% or more in a period of three years for ROGs, $NO_X$, CO and $PM_{10}$. However, air basins may use alternative emission reduction strategy that achieves a reduction of less than 5% per year under certain circumstances.

**AQMP**

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of AQMP to meet the state and federal ambient air quality standards (10). AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

## APPLICABLE REGULATORY REQUIRMENTS

SCAQMD Rules that are currently applicable during construction activity for this Project include but are not limited to Rule 403 (Fugitive Dust), Rule 445 (Wood Burning Devices), and Rule 1113 (Architectural Coatings) (3) (4) (5).

**SCAQMD Rule 403**

This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (human-made) fugitive dust sources by requiring actions to prevent and reduce fugitive dust emissions. Rule 403 applies to any activity or human-made condition capable of generating fugitive dust and requires best available control measures to be applied to earth moving and grading activities. This rule is intended to reduce $PM_{10}$ emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust. $PM_{10}$ suppression techniques are summarized below.

- Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.
- All onsite roads will be paved as soon as feasible or watered periodically or chemically stabilized.
- All material transported offsite will be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.
- Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the workday to remove soil tracked onto the paved surface.

**SCAQMD Rule 445**

This rule is intended to reduce the emission of particulate matter from wood-burning devices. The Project is required to comply with SCAQMD Rule 445, which prohibits the use of wood burning stoves and fireplaces in new development.

**SCAQMD Rule 1113**

This rule serves to limit the volatile organic compound (VOC) content of architectural coatings used on projects in the SCAQMD. Any person who supplies, sells, offers for sale, or manufactures any architectural coating for use on projects in the SCAQMD must comply with the current VOC standards set in this rule.

## METHODOLOGY

In May 2022, the California Air Pollution Control Officers Association (CAPCOA) in conjunction with other California air districts, including SCAQMD, released the latest version of the CalEEMod Version 2022.1. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, $NO_X$, $SO_X$, CO, $PM_{10}$, and $PM_{2.5}$) and GHG emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (6). Accordingly, the latest version of CalEEMod has been used for this Project to determine construction and operational air quality and greenhouse gas emissions.

### Standards of Significance

The criteria used to determine the significance of potential Project-related air quality impacts are taken from the California Environmental Quality Act Guidelines (CEQA Guidelines) (14 CCR §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would (7):

- **Threshold 1**: Conflict with or obstruct implementation of the applicable air quality plan.
- **Threshold 2**: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard.
- **Threshold 3**: Expose sensitive receptors to substantial pollutant concentrations.

- **Threshold 4**: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

**AIR QUALITY REGIONAL EMISSIONS THRESHOLDS**

The SCAQMD has developed regional significance thresholds for criteria pollutants, as summarized at Table 1 (8). The SCAQMD's CEQA Air Quality Significance Thresholds (March 2023) indicate that any projects in the South Coast Air Basin (SCAB) with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

**TABLE 1: MAXIMUM DAILY REGIONAL EMISSIONS THRESHOLDS**

| Pollutant | Construction | Operations |
|---|---|---|
| $NO_X$ | 100 lbs/day | 55 lbs/day |
| VOC | 75 lbs/day | 55 lbs/day |
| $PM_{10}$ | 150 lbs/day | 150 lbs/day |
| $PM_{2.5}$ | 55 lbs/day | 55 lbs/day |
| $SO_X$ | 150 lbs/day | 150 lbs/day |
| CO | 550 lbs/day | 550 lbs/day |

lbs/day – Pounds Per Day

**AIR QUALITY LOCALIZED EMISSIONS THRESHOLDS**

For this Project, the appropriate SRA for the LST analysis is the SCAQMD Northwest San Bernardino Valley Area monitoring station (SRA 32). LSTs apply to CO, $NO_2$, $PM_{10}$, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size. The SCAQMD's screening look-up tables are utilized in determining localized impacts. It should be noted that since the look-up tables identify thresholds at only 1 acre, 2 acres, and 5 acres, linear regression has been utilized to determine localized significance thresholds. Consistent with SCAQMD guidance, the thresholds presented in Table 2 were calculated by interpolating the threshold values for the Project's disturbed acreage.

The acres disturbed is based on the equipment list and days in the site preparation and grading phase according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday. The equipment-specific grading rates are summarized in the CalEEMod user's guide, Appendix A: Calculation Details for CalEEMod (9). It should be noted that the disturbed area per day is representative of a piece of equipment making multiple passes over the same land area. In other words, one Rubber Tired Dozer can make multiple passes over the same land area totaling 0.5 acres in a given 8-hour day. Appendix A of the CalEEMod User Manual only identifies equipment-specific grading rates for Crawler Tractors, Graders, Rubber Tired Dozers, and Scrapers; therefore, Tractors/Loaders/Backhoes equipment that was included in grading was replaced with crawler tractors. For analytical purposes, emissions associated with peak site preparation and grading activities are considered for purposes of localized significance thresholds (LSTs) since this phase represents the maximum localized emissions that would occur.

The Project's construction activities could disturb a maximum of approximately 2.5 acres per day for site preparation and 3.5 acres per day for grading activities. Any other construction phases of development would result in lesser emissions and consequently lesser impacts than what is disclosed herein. As such, Table 2 presents thresholds for localized construction and operational emissions.

**TABLE 2: MAXIMUM DAILY LOCALIZED EMISSIONS THRESHOLDS**

| Source | Activity | Emissions (lbs/day) | | | |
|---|---|---|---|---|---|
| | | VOC | NOX | $PM_{10}$ | $PM_{2.5}$ |
| Construction | Site Preparation | 187 lbs/day | 1,392 lbs/day | 8 lbs/day | 6 lbs/day |
| | Grading | 220 lbs/day | 1,713 lbs/day | 11 lbs/day | 7 lbs/day |

[1]Source of localized significance threshold (LSTs) is provided on page 14.

**REGIONAL CONSTRUCTION EMISSIONS SUMMARY**

The estimated maximum daily construction emissions without mitigation are summarized on Table 3. Detailed construction model outputs are presented in Attachment A. Under the assumed scenarios, emissions resulting from the Project construction will not exceed thresholds established by the SCAQMD for emissions of any criteria pollutant.

**TABLE 3: OVERALL REGIONAL CONSTRUCTION EMISSIONS SUMMARY**

| Source | Emissions (lbs/day) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| Summer | | | | | | |
| 2024 | 1.42 | 12.50 | 16.30 | 0.03 | 0.91 | 0.59 |
| Winter | | | | | | |
| 2024 | 4.58 | 45.80 | 36.40 | 0.14 | 8.78 | 4.81 |
| 2025 | 39.90 | 7.53 | 10.90 | 0.01 | 0.54 | 0.37 |
| **Maximum Daily Emissions** | **39.90** | **45.80** | **36.40** | **0.14** | **8.78** | **4.81** |
| SCAQMD Regional Threshold | 75 | 100 | 550 | 150 | 150 | 55 |
| Threshold Exceeded? | NO | NO | NO | NO | NO | NO |

[1]$PM_{10}$ and $PM_{2.5}$ source emissions reflect 3x daily watering per SCAQMD Rule 403 for fugitive dust.

**REGIONAL OPERATIONAL EMISSIONS**

Operational activities associated with the Project would result in emissions of CO, VOCs, $NO_X$, $SO_X$, $PM_{10}$, and $PM_{2.5}$. Operational related emissions are expected from the following primary sources: area source emissions, energy source emissions, and mobile source emissions,

The Project related operational air quality impacts derive primarily from vehicle trips generated by the Project. Trip characteristics available from the *Villa Serena Specific Plan Traffic Analysis* report were utilized in this analysis (10).

The estimated operation-source emissions from the Project are summarized on Table 4. Detailed operation model outputs are presented in Attachment A. As shown on Table 4, operational-source emissions would not exceed the applicable SCAQMD regional thresholds for emissions of any criteria pollutant.

**TABLE 4: TOTAL PROJECT REGIONAL OPERATIONAL EMISSIONS**

| Source | Emissions (lbs/day) | | | | | |
|---|---|---|---|---|---|---|
| | VOC | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| Summer | | | | | | |
| Mobile Source | 2.47 | 2.22 | 20.80 | 0.05 | 1.68 | 0.33 |
| Area Source | 3.32 | 1.01 | 4.09 | 0.01 | 0.08 | 0.08 |
| Energy Source | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | 0.04 |
| **Total Maximum Daily Emissions** | **5.82** | **3.74** | **25.11** | **0.06** | **1.80** | **0.45** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| Threshold Exceeded? | NO | NO | NO | NO | NO | NO |
| Winter | | | | | | |
| Mobile Source | 2.29 | 2.38 | 17.50 | 0.05 | 1.68 | 0.33 |
| Area Source | 2.99 | 0.97 | 0.41 | 0.01 | 0.08 | 0.08 |
| Energy Source | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | 0.04 |
| **Total Maximum Daily Emissions** | **5.31** | **3.86** | **18.13** | **0.06** | **1.80** | **0.45** |
| SCAQMD Regional Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| Threshold Exceeded? | NO | NO | NO | NO | NO | NO |

**LOCALIZED CONSTRUCTION EMISSIONS**

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (LST Methodology) (11). The SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the federal and/or state ambient air quality standards (NAAQS/CAAQS). Collectively, these are referred to as Localized Significance Thresholds (LSTs). The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4[1]. LSTs represent

1 The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Further, the SCAQMD defines Environmental Justice as "...equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

The SCAQMD recommends that the nearest sensitive receptor be considered when determining the Project's potential to cause an individual or cumulatively significant impact. The nearest land use where an individual could remain for 24 hours to the Project site has been used to determine localized construction and operational air quality impacts for emissions of $PM_{10}$ and $PM_{2.5}$ (since $PM_{10}$ and $PM_{2.5}$ thresholds are based on a 24-hour averaging time). The nearest receptor used for evaluation of localized impacts of $PM_{10}$ and $PM_{2.5}$ is location R10 represented by the existing residence at 1540 N Himalayas Circle, approximately 12 feet northwest of the Project site. Receptors in the Project study area shown on Exhibit 2.

As previously stated, and consistent with LST Methodology, the nearest industrial/commercial use to the Project site is used to determine construction and operational LST air impacts for emissions of $NO_X$ and CO as the averaging periods for these pollutants are shorter (8 hours or less) and it is reasonable to assume that an individual could be present at these sites for periods of one to 8 hours. It should be noted that the existing residence (R10) is located at a closer distance than the nearest industrial/commercial use. As such, the same receptor will be used for evaluation of localized $NO_X$ and CO.

It should be noted that the *LST Methodology* explicitly states that "*It is possible that a project may have receptors closer than 25 meters. Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters* (11)." As such, for evaluation of localized $PM_{10}$, $PM_{2.5}$, $NO_x$ and CO, a 25-meter distance will be used.

**EXHIBIT 2: SENSITIVE RECEPTOR LOCATIONS**



**LOCALIZED OPERATIONAL EMISSIONS**

Table 5 identifies the localized impacts at the nearest receptor location in the vicinity of the Project. Outputs from the model runs for construction LSTs are provided in Attachment A. For analytical purposes, emissions associated with peak demolition, site preparation and grading activities are considered for purposes of LSTs since these phases represents the maximum localized emissions that would occur. Any other construction phases of development that overlap would result in lesser emissions and consequently lesser impacts than what is disclosed herein. As shown in Table 5, emissions resulting from the Project construction will not exceed the numerical thresholds of significance established by the SCAQMD for any criteria pollutant. Thus, a less than significant impact would occur for localized Project-related construction-source emissions and no mitigation is required.

**TABLE 5: PROJECT LOCALIZED CONSTRUCTION IMPACTS**

| On-Site Emissions | Emissions (lbs/day) | | | |
|---|---|---|---|---|
| | $NO_X$ | CO | $PM_{10}$ | $PM_{2.5}$ |
| Site Preparation | | | | |
| Maximum Daily Emissions | 42.50 | 35.30 | 7.91 | 4.76 |
| SCAQMD Localized Threshold | 187 | 1,392 | 8 | 6 |
| Threshold Exceeded? | NO | NO | NO | NO |
| Grading | | | | |
| Maximum Daily Emissions | 23.10 | 20.60 | 3.62 | 2.16 |
| SCAQMD Localized Threshold | 220 | 1,713 | 11 | 7 |
| Threshold Exceeded? | NO | NO | NO | NO |

## AIR QUALITY IMPACTS – CONSISTENCY WITH THRESHOLD NO. 1

***Would the Project conflict with or obstruct implementation of the applicable air quality plan?***

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 10,743 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of AQMPs to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

In December 2022, the SCAQMD released the Final 2022 AQMP (2022 AQMP). The 2022 AQMP continues to evaluate current integrated strategies and control measures to meet the CAAQS, as well as explore new and innovative methods to reach its goals. Some of these approaches include utilizing incentive programs, recognizing existing co-benefit programs from other sectors, and developing a strategy with fair-share reductions at the federal, state, and local levels (12). Similar to the 2016 AQMP, the 2022 AQMP incorporates scientific and technological information and planning assumptions, including the 2020-2045 RTP/SCS, a planning document that supports the integration of land use and transportation to help the region meet the federal CAA requirements (13). The Project's consistency with the AQMP will be determined using the 2022 AQMP as discussed below.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the 1993 CEQA Handbook (18). These indicators are discussed below.

***The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.***

The violations that under this criterion refer to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if regional or localized significance thresholds were exceeded.

CAAQS and NAAQS violations would occur if regional or localized significance thresholds were exceeded. As evaluated, the Project's regional and localized construction and operational-source emissions would not exceed applicable regional significance thresholds. As such, a less than significant impact is expected.

On the basis of the preceding discussion, the Project is determined to be consistent with the first criterion.

***The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.***

The 2022 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the SCAG, which develops regional growth forecasts, which are then used to develop future air quality forecasts for the AQMP. Development consistent with the growth projections in City of Upland General Plan is considered to be consistent with the AQMP.

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities. As such, when considering that no emissions thresholds will be exceeded, a less than significant impact would result.

The City of Upland General Plan designates the Project site for Public Utilities – Flood Control (PU-FC). The (PU) land use designation provides areas for landfills, flood control/recharge facilities, and public utilities including gas, electricity, and water (14).

As indicated, the proposed Project will consist of 65 single family residential dwelling units, the 15th Street extension and the basin trail, which would likely exceed the growth intensities. As the proposed Project is consistent with site's land use designation, would not exceed any applicable regional or local thresholds, and would not result in or cause NAAQS or CAAQS violations, the Project is therefore considered to be consistent with the AQMP and a less than significant impact is expected.

On the basis of the preceding discussion, the Project is determined to be consistent with the second criterion.

## AIR QUALITY IMPACTS – CONSISTENCY WITH THRESHOLD NO. 2

***Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?***

The CAAQS designate the Project site as nonattainment for $O_3$, $PM_{10}$, and $PM_{2.5}$ while the NAAQS designates the Project site as nonattainment for $O_3$ and $PM_{2.5}$.

The SCAQMD has published a report on how to address cumulative impacts from air pollution: White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution (15). In this report the SCAQMD clearly states (Page D-3):

> *"…the SCAQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for TAC emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.*
>
> *Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."*

Therefore, this analysis assumes that individual projects that do not generate operational or construction emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also not cause a cumulatively considerable increase in emissions for those pollutants for which SCAB is in nonattainment, and, therefore, would not be considered to have a significant, adverse air quality impact. Alternatively, individual project-related construction and operational emissions that exceed SCAQMD thresholds for project-specific impacts would be considered cumulatively considerable.

**Construction Impacts**

The Project-specific evaluation of emissions presented in the preceding analysis demonstrates that proposed Project construction-source air pollutant emissions would not result in

exceedances of regional thresholds. Therefore, proposed Project construction-source emissions would be considered less than significant on a project-specific and cumulative basis.

**Operational Impacts**

The Project-specific evaluation of emissions presented in the preceding analysis demonstrates that proposed Project operational-source air pollutant emissions would not result in exceedances of regional thresholds. Therefore, the proposed Project operational-source emissions would be considered less than significant on a project-specific and cumulative basis.

## AIR QUALITY IMPACTS – CONSISTENCY WITH THRESHOLD NO. 3

***Would the expose sensitive receptors to substantial pollutant concentrations?***

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Results of the LST analysis indicate that the Project will not exceed the SCAQMD localized significance thresholds during construction. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during Project construction.

Additionally, the Project will not exceed the SCAQMD localized significance thresholds during operational activity. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations as the result of Project operations.

***CO "HOT SPOT" ANALYSIS***

As discussed below, the Project would not result in potentially adverse CO concentrations or "hot spots." An adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9 ppm were to occur.

It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment.

To establish a more accurate record of baseline CO concentrations affecting the SCAB, a CO "hot spot" analysis was conducted in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods[2]. This "hot spot" analysis did not predict any exceedance e of the 1-hour (20.0 ppm) or 8-hour (9.0 ppm) CO standards, as shown on Table 6.

[2] The CO "hot spot" analysis conducted in 2003 is the most current study used for CO "hot spot" analysis in the SCAB.

**TABLE 6: CO MODEL RESULTS**

| Intersection Location | CO Concentrations (ppm) | | |
|---|---|---|---|
| | Morning 1-hour | Afternoon 1-hour | 8-hour |
| Wilshire Boulevard/Veteran Avenue | 4.6 | 3.5 | 3.7 |
| Sunset Boulevard/Highland Avenue | 4 | 4.5 | 3.5 |
| La Cienega Boulevard/Century Boulevard | 3.7 | 3.1 | 5.2 |
| Long Beach Boulevard/Imperial Highway | 3 | 3.1 | 8.4 |

Notes: Federal 1-hour standard is 35 ppm and the deferral 8-hour standard is 9.0 ppm.

Based on the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (*1992 CO Plan*), peak carbon monoxide concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of traffic volumes and congestion at a particular intersection. As evidence of this, for example, of the 8.4 ppm 8-hr CO concentration measured at the Long Beach Blvd. and Imperial Hwy. intersection (i.e., the highest CO generating intersection within the "hot spot" analysis), only 0.7 ppm was attributable to the traffic volumes and congestion at this intersection; the remaining 7.7 ppm were due to the ambient air measurements at the time the 2003 AQMP was prepared (16). In contrast, an adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9 ppm were to occur.

The ambient 1-hr and 8-hr CO concentration within the Project study area is estimated to be 2.1 ppm and 1.5 ppm, respectively (data from Central Orange County station for 2021). Therefore, even if the traffic volumes for the proposed Project were ten times the traffic volumes generated at the Long Beach Blvd. and Imperial Hwy. intersection, due to the on-going improvements in ambient air quality and vehicular emissions controls, the Project would not be capable of resulting in a CO "hot spot" at any study area intersections. As noted above, only 0.7 ppm were attributable to the traffic volumes and congestion at one of the busiest intersections in the SCAB. Therefore if these traffic volumes were multiplied by ten times, it could be expected that the CO attributable to traffic would increase tenfold as well, resulting in 7 ppm – even if this were added to either the 1-hour or 8-hour CO concentrations within the Project study area, this would result in 9.1 ppm and 8.5 ppm for the 1-hr and 8-hr timeframes, respectively. Neither of which would exceed the applicable 1-hr standard of 20 ppm or the 8-hr standard of 9 ppm.

Similar considerations are also employed by other Air Districts when evaluating potential CO concentration impacts. More specifically, the Bay Area Air Quality Management District (BAAQMD) concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour (vph)—or 24,000 vph where vertical and/or horizontal air does not mix—in order to generate a significant CO impact (17). Traffic volumes generating the CO concentrations for the "hot spot" analysis is shown on Table 3-11. The busiest intersection evaluated was that at Wilshire Boulevard and Veteran Avenue, which had AM/PM traffic volumes of 8,062 vph and 7,719 vph respectively (16).

**TABLE 7: CO MODEL RESULTS**

| Intersection Location | Peak Traffic Volumes (vph) | | | | |
|---|---|---|---|---|---|
| | Eastbound (AM/PM) | Westbound (AM/PM) | Southbound (AM/PM) | Northbound (AM/PM) | Total (AM/PM) |
| Wilshire Boulevard/Veteran Avenue | 4,954/2,069 | 1,830/3,317 | 721/1,400 | 560/933 | 8,062/7,719 |
| Sunset Boulevard/Highland Avenue | 1,417/1,764 | 1,342/1,540 | 2,304/1,832 | 1,551/2,238 | 6,614/5,374 |
| La Cienega Boulevard/Century Boulevard | 2,540/2,243 | 1,890/2,728 | 1,384/2,029 | 821/1,674 | 6,634/8,674 |
| Long Beach Boulevard/Imperial Highway | 1,217/2,020 | 1,760/1,400 | 479/944 | 756/1,150 | 4,212/5,514 |

## AIR QUALITY IMPACTS – CONSISTENCY WITH THRESHOLD NO. 4

***Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?***

The potential for the Project to generate objectionable odors has also been considered. Land uses generally associated with odor complaints include:

- Agricultural uses (livestock and farming)
- Wastewater treatment plants
- Food processing plants
- Chemical plants
- Composting operations
- Refineries
- Landfills
- Dairies
- Fiberglass molding facilities

The Project does not contain land uses typically associated with emitting objectionable odors. Potential odor sources associated with the proposed Project may result from construction equipment exhaust and the application of asphalt and architectural coatings during construction activities and the temporary storage of typical solid waste (refuse) associated with the proposed Project's (long-term operational) uses. Standard construction requirements would minimize odor impacts from construct ion. The construction odor emissions would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction and is thus considered less than significant. It is expected that Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with the solid waste regulations. The proposed Project would also be required to comply with SCAQMD Rule 402 to prevent occurrences of public nuisances. Therefore, odors associated with the proposed Project construction and operations would be less than significant and no mitigation is required (18).

# PROJECT GHG ANALYSIS

## CLIMATE CHANGE SETTING

Global climate change (GCC) is the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. The majority of scientists believe that the climate shift taking place since the Industrial Revolution is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of GHGs in the earth's atmosphere, including carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases. The majority of scientists believe that this increased rate of climate change is the result of GHGs resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this memo cannot generate enough GHG emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of GHGs combined with the cumulative increase of all other sources of GHGs, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, this memo will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO2, N2O, CH4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radiative heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

Gases that trap heat in the atmosphere are often referred to as GHGs. GHGs are released into the atmosphere by both natural and anthropogenic activity. Without the natural GHG effect, the earth's average temperature would be approximately 61 degrees Fahrenheit (°F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

For the purposes of this analysis, emissions of CO2, CH4, and N2O were evaluated because these gases are the primary contributors to GCC from development projects. Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

## REGULATORY SETTING

### Executive Order S-3-05

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.

- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

**Assembly Bill (AB) 32**

The California State Legislature enacted AB 32, which requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. "GHGs" as defined under AB 32 include $CO_2$, $CH_4$, $N_2O$, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. CARB is the state agency charged with monitoring and regulating sources of GHGs. Pursuant to AB 32, CARB adopted regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 states the following:

"Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems."

CARB approved the 1990 GHG emissions level of 427 million metric ton of CO2 equivalent per year ($MMTCO_2e$) on December 6, 2007 (19). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" (BAU) scenario were estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (20). At that level, a 28.4% reduction was required to achieve the 427 $MMTCO_2e$ 1990 inventory. In October 2010, CARB prepared an updated BAU 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 $MMTCO_2e$. Therefore, under the updated forecast, a 21.7% reduction from BAU is required to achieve 1990 levels (21).

**Progress in Achieving AB 32 Targets and Remaining Reductions Required**

The State has made steady progress in implementing AB 32 and achieving targets included in Executive Order S-3-05. The progress is shown in updated emission inventories prepared by CARB for 2000 through 2012 (22). The State has achieved the Executive Order S-3-05 target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target.

- 1990: 427 $MMTCO_2e$ (AB 32 2020 target)
- 2000: 463 $MMTCO_2e$ (an average 8% reduction needed to achieve 1990 base)
- 2010: 450 $MMTCO_2e$ (an average 5% reduction needed to achieve 1990 base)

CARB has also made substantial progress in achieving its goal of achieving 1990 emissions levels by 2020. As described earlier in this section, CARB revised the 2020 BAU inventory forecast to account for new lower growth projections, which resulted in a new lower reduction from BAU to achieve the 1990 base. The previous reduction from 2020 BAU needed to achieve 1990 levels was 28.4% and the latest reduction from 2020 BAU is 21.7%.

- 2020: 545 $MMTCO_2e$ BAU (an average 21.7% reduction from BAU needed to achieve 1990 base)

**Senate Bill (SB) 32**

On September 8, 2016, Governor Jerry Brown signed the SB 32 and its companion bill, AB 197. SB 32 requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal of 1990 levels by 2020 and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction target of 80% below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that CARB not only responds to the Governor, but also the Legislature (23).

**AB 197**

A condition of approval for SB 32 was the passage of AB 197. AB 197 requires that CARB consider the social costs of GHG emissions and prioritize direct reductions in GHG emissions at mobile sources and large stationary sources. AB 197 also gives the California legislature more oversight over CARB through the addition of two legislatively appointed members to the CARB Board and the establishment a legislative committee to make recommendations about CARB programs to the legislature.

**Executive Order B-55-18 and SB 100**

Executive Order B-55-18 and SB 100. SB 100 and Executive Order B-55-18 were signed by Governor Brown on September 10, 2018. Under the existing RPS, 25% of retail sales are required to be from renewable sources by December 31, 2016, 33% by December 31, 2020, 40% by December 31, 2024, 45% by December 31, 2027, and 50% by December 31, 2030. SB 100 raises California's RPS requirement to 50% renewable resources target by December 31, 2026, and to achieve a 60% target by December 31, 2030. SB 100 also requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours of those products sold to their retail end-use customers achieve 44% of retail sales by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. In addition to targets under AB 32 and SB 32, Executive Order B-55-18 establishes a carbon neutrality goal for the state of California by 2045; and sets a goal to maintain net negative emissions thereafter. The Executive Order directs the California Natural Resources Agency (CNRA), California Environmental Protection Agency (CalEPA), the Department of Food and Agriculture (CDFA), and CARB to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.

**Title 24 California Code of Regulations (CCR)**

California Code of Regulations (CCR) Title 24 Part 6: The California Energy Code was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption.

The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. CCR, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on August 1, 2009, and is administered by the California Building Standards Commission.

CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2022 California Green Building Code Standards that became effective on January 1, 2023[3]. As construction of the Project is anticipated to be completed in 2025, it is presumed that the Project would be required to comply with the Title 24 standards in place at that time.

**SCAQMD**

SCAQMD is the agency responsible for air quality planning and regulation in the SCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim CEQA GHG Significance Threshold, that could be applied by lead agencies. The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to the project's operational emissions. If a project's emissions are below one of the following screening thresholds, then the project is less than significant:
    - Residential and commercial land use: 3,000 metric ton of $CO_2$ equivalent ($MTCO_2e/yr$)

[3] The 2022 California Green Building Standard Code was published on July 1, 2022.

  - Industrial land use: 10,000 $MTCO_2e/yr$
  - Based on land use type: residential: 3,500 $MTCO_2e/yr$; commercial: 1,400 $MTCO_2e/yr$; or mixed use: 3,000 $MTCO_2e/yr$

- Tier 4 has the following options:
  - Option 1: Reduce Business-as-Usual (BAU) emissions by a certain percentage; this percentage is currently undefined.
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
  - Option 3: 2020 target for service populations (SP), which includes residents and employees: 4.8 $MTCO_2e$ per SP per year for projects and 6.6 $MTCO_2e$ per SP per year for plans;
  - Option 3, 2035 target: 3.0 $MTCO_2e$ per SP per year for projects and 4.1 $MTCO_2e$ per SP per year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's interim thresholds used the Executive Order S-3-05-year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap $CO_2$ concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, Southern California (SoCal) Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.
- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

SCAQMD is the agency responsible for air quality planning and regulation in the SCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

**City of Upland Climate Action Plan**

The City of Upland released a final draft CAP in September 2015 in accordance with the California Environmental Quality Act, Section 15183.5(a), which states that lead agencies may adopt a plan

for the reduction of GHG emissions that can then be used for project-specific environmental documents to tier from and/or incorporate by reference that existing programmatic review pursuant to CEQA Guidelines Sections 15183.5 (b), 15064 (h), and 15130 (32). The CAP was designed under the premise that the City of Upland, and the community it represents, is uniquely capable of addressing emissions associated with sources under the City of Upland's jurisdiction, and that the City of Upland's emission reduction efforts should coordinate with the state strategies of reducing emissions in order to accomplish these reductions in an efficient and cost-effective manner.

## GHG IMPACTS

### Standards of Significance

According to the CEQA Guidelines Appendix G thresholds, to determine whether impacts from GHG emissions are significant. Would the project:

- **Threshold 1**: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- **Threshold 2**: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

The City of Upland has not adopted its own numeric threshold of significance for determining impacts with respect to greenhouse gas (GHG) emissions. A screening threshold of 3,000 $MTCO_2e$ per year to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by numerous cities in the South Coast Air Basin and is based on the South Coast Air Quality Management District (SCAQMD) staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (24). As noted by the SCAQMD:

"…the…screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects…the policy objective of [SCAQMD's] recommended interim GHG significance threshold proposal is to achieve an emission capture rate of 90 percent of all new or modified stationary source projects. significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that [SCAQMD] staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 [$MMTCO_2e$/yr]). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the statewide GHG inventory. Finally, these small sources are already subject to [Best Available Control Technology] (BACT) for criteria pollutants

and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility." (24)

Thus, and based on guidance from the SCAQMD, if a non-industrial project would emit GHGs less than 3,000 $MTCO_2e$ per year, the project is not considered a substantial GHG emitter and the GHG impact is less than significant, requiring no additional analysis and no mitigation. On the other hand, if a non-industrial project would emit GHGs in excess of 3,000 $MTCO_2e$ per year, then the project could be considered a substantial GHG emitter, requiring additional analysis and potential mitigation. As previously discussed, a screening threshold of 3,000 $MTCO_2e$ per year is an acceptable approach for small projects to determine if additional analysis is required and is therefore applied for this Project.

## GHG IMPACTS – CONSISTENCY WITH THRESHOLD NO. 1

***Would the Project have the potential to generate direct or indirect GHG emissions that would result in a significant impact on the environment?***

### PROJECT GHG EMISSIONS

The estimated GHG emissions for the Project land use are summarized on Table 8. The estimated GHG emission include emissions from Carbon Dioxide ($CO_2$), Methane ($CH_4$), Nitrous Oxide ($N_2O$), and Refrigerants (R). As shown on Table 8, the Project would generate a total of approximately 1,052.17 $MTCO_2e$/yr.

**TABLE 8: TOTAL PROJECT GHG EMISSIONS**

| Source | Emission (MT/year) | | | | |
|---|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | R | Total $CO_2E$ |
| Annual construction-related emissions amortized over 30 years | 18.77 | 1.00E-03 | 1.00E-03 | 8.00E-03 | 19.14 |
| Mobile | 778.00 | 0.04 | 0.04 | 1.32 | 792.00 |
| Area | 15.10 | < 0.005 | < 0.005 | 0.00 | 15.10 |
| Energy | 186.00 | 0.02 | < 0.005 | 0.00 | 187.00 |
| Water | 16.30 | 0.09 | < 0.005 | 0.00 | 19.20 |
| Waste | 5.60 | 0.56 | 0.00 | 0.00 | 19.60 |
| Refrigerants | 0.00 | 0.00 | 0.00 | 0.13 | 0.13 |
| Total $CO_2E$ (All Sources) | 1,052.17 | | | | |

A numerical threshold for determining the significance of GHG emissions in the SCAB has not been established by the SCAQMD for Projects where it is not the lead agency. As an interim threshold based on guidance provided in the CAPCOA *CEQA and Climate Change* handbook, the City has opted to use a non-zero threshold approach based on Approach 2 of the handbook. Threshold 2.5 (Unit-Based Thresholds Based on Market Capture) establishes a numerical threshold based on capture of approximately 90% of emissions from future development. The latest threshold developed by SCAQMD using this method is 3,000 $MTCO_2e$/yr for all projects (24).

The Project would result in approximately 1,052.17 $MTCO_2e$/yr; the proposed Project would not exceed the SCAQMD's numeric threshold of 3,000 $MTCO_2e$/yr. Thus, the Project would result in a less than significant impact with respect to GHG emissions.

## GHG IMPACTS – CONSISTENCY WITH THRESHOLD NO. 2

***Would the Project have the potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?***

As previously stated, pursuant to 15604.4 of the CEQA Guidelines, a lead agency may rely on qualitative analysis or performance-based standards to determine the significance of impacts from GHG emissions (25). Project consistency with the City's CAP is evaluated in the following discussion.

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) lays out a path to achieve targets for carbon neutrality and reduce anthropogenic greenhouse gas (GHG) emissions by 85 percent below 1990 levels no later than 2045, as directed by Assembly Bill 1279. The actions and outcomes in the plan will achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon. The 2022 Scoping Plan advocates for compliance with a local CAP to determine consistency (26).

**City of Upland CAP Consistency**

The proposed project would be required to comply with CALGreen building standards, as well as implement various sustainability features with which the project applicant is required to comply. These features would foster, among other benefits, reductions in energy consumption, waste generation, and associated pollution. In addition, newer construction materials and practices, current energy efficiency requirements, and newer appliances tend to emit lower levels of air pollutant emissions, including GHGs, as compared to materials and equipment used years ago. One of the City's methods to reduce GHG emissions is to encourage "smart growth" or promote efficient land use development (27).

According to the City's CAP under Objective B: Maximize Land Use Efficiency, the project is consistent with transportation and land use Measure T-7: Residential Density. The proposed project would increase residential density on the flood control basin, which would help the City to increase residential land use density goals in the CAP.

Finally, the Project is consistent with the general plan land use designation, density, building intensity, and applicable policies specified for the Project area in SCAG's Sustainable Community Strategy/Regional Transportation Plan, which pursuant to SB 375 calls for the integration of transportation, land-use and housing policies to plan for achievement of the GHG-emissions target for the region. Thus, a less than significant impact related to GHG emissions from Project construction and operation would occur and no mitigation is required.

## CONCLUSION

Results of the assessment indicate that the Project is not anticipated to result in a significant impact during construction or operational activities associated with air quality and greenhouse gas.

## REFERENCES


1. **Air Resources Board.** California Ambient Air Quality Standards (CAAQS). [Online] 2009. [Cited: April 16, 2018.] http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm.

2. **Environmental Protection Agency.** National Ambient Air Quality Standards (NAAQS). [Online] 1990. https://www.epa.gov/environmental-topics/air-topics.

3. **South Coast Air Quality Management District.** RULE 403. FUGITIVE DUST. [Online] https://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf?sfvrsn=4.

4. —. RULE 445. Wood-Burning Devices. [Online] http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-445.pdf.

5. —. RULE 1113. Architectural Coatings. [Online] http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf.

6. **California Air Pollution Control Officers Association (CAPCOA).** California Emissions Estimator Model (CalEEMod). [Online] May 2022. www.caleemod.com.

7. **State of California.** *2020 CEQA California Environmental Quality Act.* 2020.

8. **South Coast Air Quality Management District (SCAQMD).** SCAQMD Air Quality Significance Thresholds. [Online] https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf.

9. **California Air Pollution Control Officers Association (CAPCOA).** Appendix A: Calculation Details for CalEEMod. *CalEEMod.* [Online] http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6.

10. **Urban Crossroads, Inc.** *Villa Serena Specific Plan Traffic Analysis .* 2022.

11. **South Coast Air Quality Management District.** *Localized Significance Thresholds Methodology.* s.l. : South Coast Air Quality Managment District, 2003.

12. —. Final 2016 Air Quality Management Plan (AQMP). [Online] March 2017. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=11.

13. **Southern California Association of Governments.** 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy. [Online] September 2020. https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal-plan_0.pdf?1606001176.

14. **City of Upland.** City of Upland General Plan: Land Use Element. [Online] 2015. https://www.uplandca.gov/uploads/ftp/city_departments/development_services/planning/general_plan_map/pdfs/01_Land%20Use%20Element%20-%20revised%20LU%20map.pdf.

15. **Goss, Tracy A and Kroeger, Amy.** White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution. [Online] South Coast Air Quality Management District, 2003. http://www.aqmd.gov/rules/ciwg/final_white_paper.pdf.

16. **South Coast Air Quality Management District.** 2003 Air Quality Management Plan. [Online] 2003. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/2003-aqmp.

17. **Bay Area Air Quality Management District.** [Online] http://www.baaqmd.gov/.

18. **South Coast Air Quality Management District.** RULE 402 NUISANCE. [Online] http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-402.pdf.

19. **California Air Resources Board.** GHG 1990 Emissions Level & 2020 Limit. *California Air Resources Board.* [Online] https://ww2.arb.ca.gov/ghg-2020-limit.

20. —. *Climate Change Draft Scoping Plan.* 2008.

21. —. STATUS OF SCOPING PLAN RECOMMENDED MEASURES. [Online] [Cited: September 19, 2019.] https://ww3.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

22. —. *First Update to the Climate Change Scoping Plan.* 2014.

23. **California Legislative Information.** Senate Bill No. 32. [Online] September 8, 2016. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32.

24. **South Coast Air Quality Management District.** Interim CEQA GHG Threshold for Stationary Sources, Rules and Plans. [Online] December 5, 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf.

25. **Association of Environmental Professionals.** *2018 CEQA California Environmental Quality Act.* 2018.

26. **California Air Resources Board.** 2022 Scopuing Plan Documents. [Online] https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents.

27. **City of Upland.** City of Upland Climate Action Plan. [Online] 2015. http://www.ci.upland.ca.us/uploads/ftp/city_departments/development_services/planning/pdfs/Attachment%206%20-%20Final%20Draft%20Climate%20Action%20Plan.pdf.

# ATTACHMENT A
# CALEEMOD PROPOSED PROJECT EMISSIONS MODEL OUTPUTS

# 14896 Villa Serena Detailed Report

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# 1. Basic Project Information

## 1.1. Basic Project Information

| Data Field | Value |
|---|---|
| Project Name | 14896 Villa Serena |
| Lead Agency | — |
| Land Use Scale | Project/site |
| Analysis Level for Defaults | County |
| Windspeed (m/s) | 2.80 |
| Precipitation (days) | 2.20 |
| Location | 34.1184295523901, -117.63468136395888 |
| County | San Bernardino-South Coast |
| City | Upland |
| Air District | South Coast AQMD |
| Air Basin | South Coast |
| TAZ | 5225 |
| EDFZ | 10 |
| Electric Utility | Southern California Edison |
| Gas Utility | Southern California Gas |

## 1.2. Land Use Types

| Land Use Subtype | Size | Unit | Lot Acreage | Building Area (sq ft) | Landscape Area (sq ft) | Special Landscape Area (sq ft) | Population | Description |
|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 65.0 | Dwelling Unit | 9.16 | 126,750 | 761,336 | — | 215 | — |

### 1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

# 2. Emissions Summary

## 2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit. | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 1.71 | 1.42 | 12.5 | 16.3 | 0.03 | 0.54 | 0.37 | 0.91 | 0.50 | 0.09 | 0.59 | — | 3,185 | 3,185 | 0.14 | 0.07 | 1.95 | 3,210 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 5.44 | 39.9 | 45.8 | 36.4 | 0.14 | 2.25 | 7.12 | 8.78 | 2.07 | 2.74 | 4.81 | — | 20,938 | 20,938 | 2.08 | 2.87 | 0.98 | 21,845 |
| Average Daily (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 1.52 | 2.23 | 11.6 | 12.9 | 0.03 | 0.49 | 0.78 | 1.28 | 0.45 | 0.25 | 0.70 | — | 3,301 | 3,301 | 0.21 | 0.20 | 1.44 | 3,367 |
| Annual (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 0.28 | 0.41 | 2.12 | 2.36 | < 0.005 | 0.09 | 0.14 | 0.23 | 0.08 | 0.05 | 0.13 | — | 546 | 546 | 0.03 | 0.03 | 0.24 | 557 |

## 2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Year | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily - Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2024 | 1.71 | 1.42 | 12.5 | 16.3 | 0.03 | 0.54 | 0.37 | 0.91 | 0.50 | 0.09 | 0.59 | — | 3,185 | 3,185 | 0.14 | 0.07 | 1.95 | 3,210 |
| Daily - Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2024 | 5.44 | 4.58 | 45.8 | 36.4 | 0.14 | 2.25 | 7.12 | 8.78 | 2.07 | 2.74 | 4.81 | — | 20,938 | 20,938 | 2.08 | 2.87 | 0.98 | 21,845 |
| 2025 | 1.02 | 39.9 | 7.53 | 10.9 | 0.01 | 0.35 | 0.20 | 0.54 | 0.32 | 0.05 | 0.37 | — | 1,705 | 1,705 | 0.07 | 0.02 | 0.02 | 1,713 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2024 | 1.52 | 1.18 | 11.6 | 12.9 | 0.03 | 0.49 | 0.78 | 1.28 | 0.45 | 0.25 | 0.70 | — | 3,301 | 3,301 | 0.21 | 0.20 | 1.44 | 3,367 |
| 2025 | 0.07 | 2.23 | 0.46 | 0.68 | < 0.005 | 0.02 | 0.01 | 0.03 | 0.02 | < 0.005 | 0.02 | — | 103 | 103 | < 0.005 | < 0.005 | 0.02 | 104 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 2024 | 0.28 | 0.22 | 2.12 | 2.36 | < 0.005 | 0.09 | 0.14 | 0.23 | 0.08 | 0.05 | 0.13 | — | 546 | 546 | 0.03 | 0.03 | 0.24 | 557 |
| 2025 | 0.01 | 0.41 | 0.08 | 0.12 | < 0.005 | < 0.005 | < 0.005 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | 17.1 | 17.1 | < 0.005 | < 0.005 | < 0.005 | 17.2 |

## 2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit. | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 3.24 | 5.82 | 3.74 | 25.2 | 0.06 | 0.16 | 1.65 | 1.80 | 0.15 | 0.29 | 0.45 | 39.0 | 7,510 | 7,549 | 4.29 | 0.25 | 19.6 | 7,752 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 2.71 | 5.31 | 3.87 | 18.2 | 0.06 | 0.15 | 1.65 | 1.80 | 0.15 | 0.29 | 0.45 | 39.0 | 7,184 | 7,223 | 4.30 | 0.26 | 1.30 | 7,410 |
| Average Daily (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Unmit. | 2.78 | 5.42 | 2.98 | 20.6 | 0.05 | 0.08 | 1.62 | 1.70 | 0.08 | 0.29 | 0.37 | 39.0 | 6,006 | 6,045 | 4.27 | 0.26 | 8.77 | 6,237 |
| Annual (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unmit. | 0.51 | 0.99 | 0.54 | 3.76 | 0.01 | 0.01 | 0.30 | 0.31 | 0.01 | 0.05 | 0.07 | 6.46 | 994 | 1,001 | 0.71 | 0.04 | 1.45 | 1,033 |

## 2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Sector | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.72 | 2.47 | 2.22 | 20.8 | 0.05 | 0.03 | 1.65 | 1.68 | 0.03 | 0.29 | 0.33 | — | 5,051 | 5,051 | 0.24 | 0.23 | 18.8 | 5,145 |
| Area | 0.46 | 3.32 | 1.01 | 4.09 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,242 | 1,242 | 0.02 | < 0.005 | — | 1,243 |
| Energy | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 1,124 | 1,124 | 0.10 | 0.01 | — | 1,129 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Total | 3.24 | 5.82 | 3.74 | 25.2 | 0.06 | 0.16 | 1.65 | 1.80 | 0.15 | 0.29 | 0.45 | 39.0 | 7,510 | 7,549 | 4.29 | 0.25 | 19.6 | 7,752 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.54 | 2.29 | 2.38 | 17.5 | 0.05 | 0.03 | 1.65 | 1.68 | 0.03 | 0.29 | 0.33 | — | 4,734 | 4,734 | 0.25 | 0.24 | 0.49 | 4,813 |
| Area | 0.11 | 2.99 | 0.97 | 0.41 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,232 | 1,232 | 0.02 | < 0.005 | — | 1,233 |
| Energy | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 1,124 | 1,124 | 0.10 | 0.01 | — | 1,129 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Total | 2.71 | 5.31 | 3.87 | 18.2 | 0.06 | 0.15 | 1.65 | 1.80 | 0.15 | 0.29 | 0.45 | 39.0 | 7,184 | 7,223 | 4.30 | 0.26 | 1.30 | 7,410 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 2.47 | 2.23 | 2.38 | 17.8 | 0.05 | 0.03 | 1.62 | 1.65 | 0.03 | 0.29 | 0.32 | — | 4,697 | 4,697 | 0.25 | 0.24 | 7.95 | 4,782 |
| Area | 0.25 | 3.16 | 0.09 | 2.55 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | 0.00 | 91.1 | 91.1 | < 0.005 | < 0.005 | — | 91.2 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 1,124 | 1,124 | 0.10 | 0.01 | — | 1,129 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Total | 2.78 | 5.42 | 2.98 | 20.6 | 0.05 | 0.08 | 1.62 | 1.70 | 0.08 | 0.29 | 0.37 | 39.0 | 6,006 | 6,045 | 4.27 | 0.26 | 8.77 | 6,237 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Mobile | 0.45 | 0.41 | 0.43 | 3.25 | 0.01 | 0.01 | 0.30 | 0.30 | 0.01 | 0.05 | 0.06 | — | 778 | 778 | 0.04 | 0.04 | 1.32 | 792 |
| Area | 0.05 | 0.58 | 0.02 | 0.47 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 15.1 | 15.1 | < 0.005 | < 0.005 | — | 15.1 |
| Energy | 0.01 | 0.01 | 0.09 | 0.04 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 186 | 186 | 0.02 | < 0.005 | — | 187 |
| Water | — | — | — | — | — | — | — | — | — | — | — | 0.86 | 15.5 | 16.3 | 0.09 | < 0.005 | — | 19.2 |
| Waste | — | — | — | — | — | — | — | — | — | — | — | 5.60 | 0.00 | 5.60 | 0.56 | 0.00 | — | 19.6 |
| Refrig. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.13 | 0.13 |
| Total | 0.51 | 0.99 | 0.54 | 3.76 | 0.01 | 0.01 | 0.30 | 0.31 | 0.01 | 0.05 | 0.07 | 6.46 | 994 | 1,001 | 0.71 | 0.04 | 1.45 | 1,033 |

# 3. Construction Emissions Details

## 3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 5.35 | 4.49 | 42.5 | 35.3 | 0.05 | 2.25 | — | 2.25 | 2.07 | — | 2.07 | — | 5,529 | 5,529 | 0.22 | 0.04 | — | 5,548 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dust From Material Movement | — | — | — | — | — | — | 5.66 | 5.66 | — | 2.69 | 2.69 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.15 | 0.12 | 1.16 | 0.97 | < 0.005 | 0.06 | — | 0.06 | 0.06 | — | 0.06 | — | 151 | 151 | 0.01 | < 0.005 | — | 152 |
| Dust From Material Movement | — | — | — | — | — | — | 0.16 | 0.16 | — | 0.07 | 0.07 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.03 | 0.02 | 0.21 | 0.18 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 25.1 | 25.1 | < 0.005 | < 0.005 | — | 25.2 |
| Dust From Material Movement | — | — | — | — | — | — | 0.03 | 0.03 | — | 0.01 | 0.01 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.10 | 0.09 | 0.10 | 1.12 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | — | 231 | 231 | 0.01 | 0.01 | 0.03 | 234 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.03 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 6.42 | 6.42 | < 0.005 | < 0.005 | 0.01 | 6.51 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.01 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 1.06 | 1.06 | < 0.005 | < 0.005 | < 0.005 | 1.08 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.3. Grading (2024) - Unmitigated

### Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 3.02 | 2.53 | 23.1 | 20.6 | 0.03 | 1.33 | — | 1.33 | 1.22 | — | 1.22 | — | 3,134 | 3,134 | 0.13 | 0.03 | — | 3,144 |
| Dust From Material Movement | — | — | — | — | — | — | 2.29 | 2.29 | — | 0.94 | 0.94 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.17 | 0.14 | 1.27 | 1.13 | < 0.005 | 0.07 | — | 0.07 | 0.07 | — | 0.07 | — | 172 | 172 | 0.01 | < 0.005 | — | 172 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dust From Material Movement | — | — | — | — | — | — | 0.13 | 0.13 | — | 0.05 | 0.05 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.03 | 0.03 | 0.23 | 0.21 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 28.4 | 28.4 | < 0.005 | < 0.005 | — | 28.5 |
| Dust From Material Movement | — | — | — | — | — | — | 0.02 | 0.02 | — | 0.01 | 0.01 | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.08 | 0.07 | 0.09 | 0.96 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | — | 198 | 198 | 0.01 | 0.01 | 0.02 | 200 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 2.31 | 0.35 | 22.5 | 12.2 | 0.12 | 0.33 | 1.32 | 1.65 | 0.22 | 0.44 | 0.66 | — | 17,607 | 17,607 | 1.94 | 2.83 | 0.96 | 18,500 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.06 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 11.0 | 11.0 | < 0.005 | < 0.005 | 0.02 | 11.2 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.13 | 0.02 | 1.25 | 0.66 | 0.01 | 0.02 | 0.07 | 0.09 | 0.01 | 0.02 | 0.04 | — | 965 | 965 | 0.11 | 0.16 | 0.87 | 1,014 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.01 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 1.82 | 1.82 | < 0.005 | < 0.005 | < 0.005 | 1.85 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.02 | < 0.005 | 0.23 | 0.12 | < 0.005 | < 0.005 | 0.01 | 0.02 | < 0.005 | < 0.005 | 0.01 | — | 160 | 160 | 0.02 | 0.03 | 0.14 | 168 |

## 3.5. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.55 | 1.30 | 12.2 | 14.2 | 0.03 | 0.54 | — | 0.54 | 0.49 | — | 0.49 | — | 2,630 | 2,630 | 0.11 | 0.02 | — | 2,639 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.55 | 1.30 | 12.2 | 14.2 | 0.03 | 0.54 | — | 0.54 | 0.49 | — | 0.49 | — | 2,630 | 2,630 | 0.11 | 0.02 | — | 2,639 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.98 | 0.82 | 7.67 | 8.97 | 0.02 | 0.34 | — | 0.34 | 0.31 | — | 0.31 | — | 1,657 | 1,657 | 0.07 | 0.01 | — | 1,663 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.18 | 0.15 | 1.40 | 1.64 | < 0.005 | 0.06 | — | 0.06 | 0.06 | — | 0.06 | — | 274 | 274 | 0.01 | < 0.005 | — | 275 |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.13 | 0.12 | 0.11 | 1.98 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | — | 337 | 337 | 0.01 | 0.01 | 1.35 | 342 |
| Vendor | 0.02 | 0.01 | 0.25 | 0.13 | < 0.005 | < 0.005 | 0.01 | 0.02 | < 0.005 | < 0.005 | 0.01 | — | 218 | 218 | 0.02 | 0.03 | 0.61 | 229 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.13 | 0.12 | 0.13 | 1.50 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | — | 309 | 309 | 0.01 | 0.01 | 0.03 | 313 |
| Vendor | 0.02 | 0.01 | 0.26 | 0.14 | < 0.005 | < 0.005 | 0.01 | 0.02 | < 0.005 | < 0.005 | 0.01 | — | 218 | 218 | 0.02 | 0.03 | 0.02 | 228 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.08 | 0.07 | 0.08 | 0.99 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | — | 197 | 197 | 0.01 | 0.01 | 0.37 | 200 |
| Vendor | 0.01 | < 0.005 | 0.17 | 0.09 | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | 137 | 137 | 0.01 | 0.02 | 0.16 | 144 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.01 | 0.01 | 0.02 | 0.18 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 32.7 | 32.7 | < 0.005 | < 0.005 | 0.06 | 33.1 |
| Vendor | < 0.005 | < 0.005 | 0.03 | 0.02 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | — | 22.7 | 22.7 | < 0.005 | < 0.005 | 0.03 | 23.8 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.7. Paving (2024) - Unmitigated

### Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 1.01 | 0.85 | 7.81 | 10.0 | 0.01 | 0.39 | — | 0.39 | 0.36 | — | 0.36 | — | 1,512 | 1,512 | 0.06 | 0.01 | — | 1,517 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | < 0.005 | < 0.005 | 0.02 | 0.02 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 2.96 | 2.96 | < 0.005 | < 0.005 | — | 2.97 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 0.49 | 0.49 | < 0.005 | < 0.005 | — | 0.49 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.08 | 0.07 | 0.09 | 0.96 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | — | 198 | 198 | 0.01 | 0.01 | 0.02 | 200 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 0.39 | 0.39 | < 0.005 | < 0.005 | < 0.005 | 0.40 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 0.07 | 0.07 | < 0.005 | < 0.005 | < 0.005 | 0.07 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.95 | 0.80 | 7.45 | 9.98 | 0.01 | 0.35 | — | 0.35 | 0.32 | — | 0.32 | — | 1,511 | 1,511 | 0.06 | 0.01 | — | 1,517 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.05 | 0.04 | 0.39 | 0.53 | < 0.005 | 0.02 | — | 0.02 | 0.02 | — | 0.02 | — | 79.9 | 79.9 | < 0.005 | < 0.005 | — | 80.1 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.01 | 0.01 | 0.07 | 0.10 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 13.2 | 13.2 | < 0.005 | < 0.005 | — | 13.3 |
| Paving | — | 0.00 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.07 | 0.06 | 0.07 | 0.88 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | — | 194 | 194 | 0.01 | 0.01 | 0.02 | 196 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.05 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 10.4 | 10.4 | < 0.005 | < 0.005 | 0.02 | 10.5 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.01 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 1.72 | 1.72 | < 0.005 | < 0.005 | < 0.005 | 1.74 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.11. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Onsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.21 | 0.17 | 1.18 | 1.52 | < 0.005 | 0.04 | — | 0.04 | 0.03 | — | 0.03 | — | 178 | 178 | 0.01 | < 0.005 | — | 179 |
| Architectural Coatings | — | 39.7 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | 0.01 | 0.01 | 0.06 | 0.08 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 9.76 | 9.76 | < 0.005 | < 0.005 | — | 9.79 |
| Architectural Coatings | — | 2.17 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Off-Road Equipment | < 0.005 | < 0.005 | 0.01 | 0.02 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 1.62 | 1.62 | < 0.005 | < 0.005 | — | 1.62 |
| Architectural Coatings | — | 0.40 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Onsite truck | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | 0.02 | 0.02 | 0.02 | 0.27 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 60.5 | 60.5 | < 0.005 | < 0.005 | 0.01 | 61.2 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Average Daily | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | 0.02 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 3.36 | 3.36 | < 0.005 | < 0.005 | 0.01 | 3.41 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Worker | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | 0.00 | 0.00 | — | 0.56 | 0.56 | < 0.005 | < 0.005 | < 0.005 | 0.56 |
| Vendor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# 4. Operations Emissions Details

## 4.1. Mobile Emissions by Land Use

### 4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 2.72 | 2.47 | 2.22 | 20.8 | 0.05 | 0.03 | 0.28 | 0.31 | 0.03 | 0.09 | 0.12 | — | 5,051 | 5,051 | 0.24 | 0.23 | 18.8 | 5,145 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 2.72 | 2.47 | 2.22 | 20.8 | 0.05 | 0.03 | 0.28 | 0.31 | 0.03 | 0.09 | 0.12 | — | 5,051 | 5,051 | 0.24 | 0.23 | 18.8 | 5,145 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 2.54 | 2.29 | 2.38 | 17.5 | 0.05 | 0.03 | 0.28 | 0.31 | 0.03 | 0.09 | 0.12 | — | 4,734 | 4,734 | 0.25 | 0.24 | 0.49 | 4,813 |
| Total | 2.54 | 2.29 | 2.38 | 17.5 | 0.05 | 0.03 | 0.28 | 0.31 | 0.03 | 0.09 | 0.12 | — | 4,734 | 4,734 | 0.25 | 0.24 | 0.49 | 4,813 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 0.45 | 0.41 | 0.43 | 3.25 | 0.01 | 0.01 | 0.05 | 0.06 | 0.01 | 0.02 | 0.02 | — | 778 | 778 | 0.04 | 0.04 | 1.32 | 792 |
| Total | 0.45 | 0.41 | 0.43 | 3.25 | 0.01 | 0.01 | 0.05 | 0.06 | 0.01 | 0.02 | 0.02 | — | 778 | 778 | 0.04 | 0.04 | 1.32 | 792 |

## 4.2. Energy

### 4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | 472 | 472 | 0.04 | 0.01 | — | 475 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 472 | 472 | 0.04 | 0.01 | — | 475 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | 472 | 472 | 0.04 | 0.01 | — | 475 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 472 | 472 | 0.04 | 0.01 | — | 475 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | 78.2 | 78.2 | 0.01 | < 0.005 | — | 78.7 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | 78.2 | 78.2 | 0.01 | < 0.005 | — | 78.7 |

### 4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 652 | 652 | 0.06 | < 0.005 | — | 654 |
| Total | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 652 | 652 | 0.06 | < 0.005 | — | 654 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 652 | 652 | 0.06 | < 0.005 | — | 654 |
| Total | 0.06 | 0.03 | 0.51 | 0.22 | < 0.005 | 0.04 | — | 0.04 | 0.04 | — | 0.04 | — | 652 | 652 | 0.06 | < 0.005 | — | 654 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | 0.01 | 0.01 | 0.09 | 0.04 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 108 | 108 | 0.01 | < 0.005 | — | 108 |
| Total | 0.01 | 0.01 | 0.09 | 0.04 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 108 | 108 | 0.01 | < 0.005 | — | 108 |

## 4.3. Area Emissions by Source

### 4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Source | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | 0.11 | 0.06 | 0.97 | 0.41 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,232 | 1,232 | 0.02 | < 0.005 | — | 1,233 |
| Consumer Products | — | 2.71 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Architectural Coatings | — | 0.22 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Landscape Equipment | 0.35 | 0.33 | 0.04 | 3.68 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 9.86 | 9.86 | < 0.005 | < 0.005 | — | 9.89 |
| Total | 0.46 | 3.32 | 1.01 | 4.09 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,242 | 1,242 | 0.02 | < 0.005 | — | 1,243 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | 0.11 | 0.06 | 0.97 | 0.41 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,232 | 1,232 | 0.02 | < 0.005 | — | 1,233 |
| Consumer Products | — | 2.71 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Architectural Coatings | — | 0.22 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | 0.11 | 2.99 | 0.97 | 0.41 | 0.01 | 0.08 | — | 0.08 | 0.08 | — | 0.08 | 0.00 | 1,232 | 1,232 | 0.02 | < 0.005 | — | 1,233 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hearths | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 14.0 | 14.0 | < 0.005 | < 0.005 | — | 14.0 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consumer Products | — | 0.50 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Architectural Coatings | — | 0.04 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Landscape Equipment | 0.04 | 0.04 | < 0.005 | 0.46 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 1.12 | 1.12 | < 0.005 | < 0.005 | — | 1.12 |
| Total | 0.05 | 0.58 | 0.02 | 0.47 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | 0.00 | 15.1 | 15.1 | < 0.005 | < 0.005 | — | 15.1 |

## 4.4. Water Emissions by Land Use

### 4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 5.19 | 93.4 | 98.6 | 0.54 | 0.01 | — | 116 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 0.86 | 15.5 | 16.3 | 0.09 | < 0.005 | — | 19.2 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 0.86 | 15.5 | 16.3 | 0.09 | < 0.005 | — | 19.2 |

## 4.5. Waste Emissions by Land Use

### 4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 33.8 | 0.00 | 33.8 | 3.38 | 0.00 | — | 118 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | 5.60 | 0.00 | 5.60 | 0.56 | 0.00 | — | 19.6 |
| Total | — | — | — | — | — | — | — | — | — | — | — | 5.60 | 0.00 | 5.60 | 0.56 | 0.00 | — | 19.6 |

## 4.6. Refrigerant Emissions by Land Use

### 4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.81 | 0.81 |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Single Family Housing | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.13 | 0.13 |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.13 | 0.13 |

## 4.7. Offroad Emissions By Equipment Type

### 4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.8. Stationary Emissions By Equipment Type

### 4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.9. User Defined Emissions By Equipment Type

### 4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.10. Soil Carbon Accumulation By Vegetation Type

### 4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Vegetation | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

### 4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

### 4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Species | TOG | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | R | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daily, Summer (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily, Winter (Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequestered | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

# 5. Activity Data

## 5.1. Construction Schedule

| Phase Name | Phase Type | Start Date | End Date | Days Per Week | Work Days per Phase | Phase Description |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Site Preparation | Site Preparation | 1/2/2024 | 1/15/2024 | 5.00 | 10.0 | — |
| Grading | Grading | 1/16/2024 | 2/12/2024 | 5.00 | 20.0 | — |
| Building Construction | Building Construction | 2/13/2024 | 12/30/2024 | 5.00 | 230 | — |
| Paving | Paving | 12/31/2024 | 1/27/2025 | 5.00 | 20.0 | — |
| Architectural Coating | Architectural Coating | 1/28/2025 | 2/24/2025 | 5.00 | 20.0 | — |

## 5.2. Off-Road Equipment

### 5.2.1. Unmitigated

| Phase Name | Equipment Type | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|---|---|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | Diesel | Average | 3.00 | 8.00 | 367 | 0.40 |
| Site Preparation | Crawler Tractors | Diesel | Average | 4.00 | 8.00 | 87.0 | 0.43 |
| Grading | Excavators | Diesel | Average | 1.00 | 8.00 | 36.0 | 0.38 |
| Grading | Graders | Diesel | Average | 1.00 | 8.00 | 148 | 0.41 |
| Grading | Rubber Tired Dozers | Diesel | Average | 1.00 | 8.00 | 367 | 0.40 |
| Grading | Crawler Tractors | Diesel | Average | 3.00 | 8.00 | 87.0 | 0.43 |
| Building Construction | Cranes | Diesel | Average | 1.00 | 8.00 | 367 | 0.29 |
| Building Construction | Forklifts | Diesel | Average | 3.00 | 8.00 | 82.0 | 0.20 |
| Building Construction | Generator Sets | Diesel | Average | 1.00 | 8.00 | 14.0 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | Diesel | Average | 3.00 | 8.00 | 84.0 | 0.37 |
| Building Construction | Welders | Diesel | Average | 1.00 | 8.00 | 46.0 | 0.45 |
| Paving | Pavers | Diesel | Average | 2.00 | 8.00 | 81.0 | 0.42 |
| Paving | Paving Equipment | Diesel | Average | 2.00 | 8.00 | 89.0 | 0.36 |
| Paving | Rollers | Diesel | Average | 2.00 | 8.00 | 36.0 | 0.38 |
| Architectural Coating | Air Compressors | Diesel | Average | 1.00 | 8.00 | 37.0 | 0.48 |

## 5.3. Construction Vehicles

### 5.3.1. Unmitigated

| Phase Name | Trip Type | One-Way Trips per Day | Miles per Trip | Vehicle Mix |
|---|---|---|---|---|
| Site Preparation | — | — | — | — |
| Site Preparation | Worker | 17.5 | 18.5 | LDA,LDT1,LDT2 |
| Site Preparation | Vendor | — | 10.2 | HHDT,MHDT |
| Site Preparation | Hauling | 0.00 | 20.0 | HHDT |
| Site Preparation | Onsite truck | — | — | HHDT |
| Grading | — | — | — | — |
| Grading | Worker | 15.0 | 18.5 | LDA,LDT1,LDT2 |
| Grading | Vendor | — | 10.2 | HHDT,MHDT |
| Grading | Hauling | 250 | 20.0 | HHDT |
| Grading | Onsite truck | — | — | HHDT |
| Building Construction | — | — | — | — |
| Building Construction | Worker | 23.4 | 18.5 | LDA,LDT1,LDT2 |
| Building Construction | Vendor | 6.95 | 10.2 | HHDT,MHDT |
| Building Construction | Hauling | 0.00 | 20.0 | HHDT |
| Building Construction | Onsite truck | — | — | HHDT |
| Paving | — | — | — | — |
| Paving | Worker | 15.0 | 18.5 | LDA,LDT1,LDT2 |
| Paving | Vendor | — | 10.2 | HHDT,MHDT |
| Paving | Hauling | 0.00 | 20.0 | HHDT |
| Paving | Onsite truck | — | — | HHDT |
| Architectural Coating | — | — | — | — |
| Architectural Coating | Worker | 4.68 | 18.5 | LDA,LDT1,LDT2 |
| Architectural Coating | Vendor | — | 10.2 | HHDT,MHDT |

| | | | | |
|---|---|---|---|---|
| Architectural Coating | Hauling | 0.00 | 20.0 | HHDT |
| Architectural Coating | Onsite truck | — | — | HHDT |

## 5.4. Vehicles

### 5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

## 5.5. Architectural Coatings

| Phase Name | Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|---|---|---|---|---|---|
| Architectural Coating | 256,669 | 85,556 | 0.00 | 0.00 | — |

## 5.6. Dust Mitigation

### 5.6.1. Construction Earthmoving Activities

| Phase Name | Material Imported (cy) | Material Exported (cy) | Acres Graded (acres) | Material Demolished (sq. ft.) | Acres Paved (acres) |
|---|---|---|---|---|---|
| Site Preparation | — | — | 35.0 | 0.00 | — |
| Grading | 40,000 | — | 50.0 | 0.00 | — |
| Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 |

### 5.6.2. Construction Earthmoving Control Strategies

| Control Strategies Applied | Frequency (per day) | PM10 Reduction | PM2.5 Reduction |
|---|---|---|---|
| Water Exposed Area | 3 | 74% | 74% |

## 5.7. Construction Paving

| Land Use | Area Paved (acres) | % Asphalt |
|---|---|---|

| | | |
|---|---|---|
| Single Family Housing | 0.72 | 0% |

## 5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

| Year | kWh per Year | CO2 | CH4 | N2O |
|---|---|---|---|---|
| 2024 | 0.00 | 349 | 0.03 | < 0.005 |
| 2025 | 0.00 | 349 | 0.03 | < 0.005 |

## 5.9. Operational Mobile Sources

### 5.9.1. Unmitigated

| Land Use Type | Trips/Weekday | Trips/Saturday | Trips/Sunday | Trips/Year | VMT/Weekday | VMT/Saturday | VMT/Sunday | VMT/Year |
|---|---|---|---|---|---|---|---|---|
| Single Family Housing | 614 | 616 | 551 | 220,846 | 5,883 | 5,908 | 5,285 | 2,117,470 |

## 5.10. Operational Area Sources

### 5.10.1. Hearths

#### 5.10.1.1. Unmitigated

| Hearth Type | Unmitigated (number) |
|---|---|
| Single Family Housing | — |
| Wood Fireplaces | 0 |
| Gas Fireplaces | 59 |
| Propane Fireplaces | 0 |
| Electric Fireplaces | 0 |
| No Fireplaces | 7 |

### 5.10.2. Architectural Coatings

| Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|---|---|---|---|---|
| 256668.75 | 85,556 | 0.00 | 0.00 | — |

### 5.10.3. Landscape Equipment

| Season | Unit | Value |
|---|---|---|
| Snow Days | day/yr | 0.00 |
| Summer Days | day/yr | 250 |

## 5.11. Operational Energy Consumption

### 5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

| Land Use | Electricity (kWh/yr) | CO2 | CH4 | N2O | Natural Gas (kBTU/yr) |
|---|---|---|---|---|---|
| Single Family Housing | 494,625 | 349 | 0.0330 | 0.0040 | 2,033,832 |

## 5.12. Operational Water and Wastewater Consumption

### 5.12.1. Unmitigated

| Land Use | Indoor Water (gal/year) | Outdoor Water (gal/year) |
|---|---|---|
| Single Family Housing | 2,709,276 | 14,943,364 |

## 5.13. Operational Waste Generation

### 5.13.1. Unmitigated

| Land Use | Waste (ton/year) | Cogeneration (kWh/year) |
|---|---|---|

| | | |
|---|---|---|
| Single Family Housing | 19.0 | 0.00 |

## 5.14. Operational Refrigeration and Air Conditioning Equipment

### 5.14.1. Unmitigated

| Land Use Type | Equipment Type | Refrigerant | GWP | Quantity (kg) | Operations Leak Rate | Service Leak Rate | Times Serviced |
|---|---|---|---|---|---|---|---|
| Single Family Housing | Average room A/C & Other residential A/C and heat pumps | User Defined | 750 | < 0.005 | 2.50 | 2.50 | 10.0 |
| Single Family Housing | Household refrigerators and/or freezers | R-134a | 1,430 | 0.12 | 0.60 | 0.00 | 1.00 |

## 5.15. Operational Off-Road Equipment

### 5.15.1. Unmitigated

| Equipment Type | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|---|---|---|---|---|---|---|

## 5.16. Stationary Sources

### 5.16.1. Emergency Generators and Fire Pumps

| Equipment Type | Fuel Type | Number per Day | Hours per Day | Hours per Year | Horsepower | Load Factor |
|---|---|---|---|---|---|---|

### 5.16.2. Process Boilers

| Equipment Type | Fuel Type | Number | Boiler Rating (MMBtu/hr) | Daily Heat Input (MMBtu/day) | Annual Heat Input (MMBtu/yr) |
|---|---|---|---|---|---|

## 5.17. User Defined

| Equipment Type | Fuel Type |
|---|---|

| | |
|---|---|
| — | — |

## 5.18. Vegetation

### 5.18.1. Land Use Change

#### 5.18.1.1. Unmitigated

| Vegetation Land Use Type | Vegetation Soil Type | Initial Acres | Final Acres |
|---|---|---|---|

### 5.18.1. Biomass Cover Type

#### 5.18.1.1. Unmitigated

| Biomass Cover Type | Initial Acres | Final Acres |
|---|---|---|

### 5.18.2. Sequestration

#### 5.18.2.1. Unmitigated

| Tree Type | Number | Electricity Saved (kWh/year) | Natural Gas Saved (btu/year) |
|---|---|---|---|

# 6. Climate Risk Detailed Report

## 6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

| Climate Hazard | Result for Project Location | Unit |
|---|---|---|
| Temperature and Extreme Heat | 19.6 | annual days of extreme heat |
| Extreme Precipitation | 6.05 | annual days with precipitation above 20 mm |
| Sea Level Rise | 0.00 | meters of inundation depth |

| | | |
|---|---|---|
| Wildfire | 0.00 | annual hectares burned |

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

## 6.2. Initial Climate Risk Scores

| Climate Hazard | Exposure Score | Sensitivity Score | Adaptive Capacity Score | Vulnerability Score |
|---|---|---|---|---|
| Temperature and Extreme Heat | 2 | 0 | 0 | N/A |
| Extreme Precipitation | N/A | N/A | N/A | N/A |
| Sea Level Rise | 1 | 0 | 0 | N/A |
| Wildfire | 1 | 0 | 0 | N/A |
| Flooding | N/A | N/A | N/A | N/A |
| Drought | N/A | N/A | N/A | N/A |
| Snowpack | N/A | N/A | N/A | N/A |
| Air Quality | 0 | 0 | 0 | N/A |

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

## 6.3. Adjusted Climate Risk Scores

| Climate Hazard | Exposure Score | Sensitivity Score | Adaptive Capacity Score | Vulnerability Score |
|---|---|---|---|---|
| Temperature and Extreme Heat | 2 | 1 | 1 | 3 |

| | | | | |
|---|---|---|---|---|
| Extreme Precipitation | N/A | N/A | N/A | N/A |
| Sea Level Rise | 1 | 1 | 1 | 2 |
| Wildfire | 1 | 1 | 1 | 2 |
| Flooding | N/A | N/A | N/A | N/A |
| Drought | N/A | N/A | N/A | N/A |
| Snowpack | N/A | N/A | N/A | N/A |
| Air Quality | 1 | 1 | 1 | 2 |

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

## 6.4. Climate Risk Reduction Measures

# 7. Health and Equity Details

## 7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

| Indicator | Result for Project Census Tract |
|---|---|
| Exposure Indicators | — |
| AQ-Ozone | 93.6 |
| AQ-PM | 98.2 |
| AQ-DPM | 45.9 |
| Drinking Water | 93.7 |
| Lead Risk Housing | 8.71 |
| Pesticides | 53.1 |
| Toxic Releases | 54.7 |
| Traffic | 84.6 |

| | |
|---|---|
| Effect Indicators | — |
| CleanUp Sites | 22.9 |
| Groundwater | 14.3 |
| Haz Waste Facilities/Generators | 65.2 |
| Impaired Water Bodies | 0.00 |
| Solid Waste | 52.9 |
| Sensitive Population | — |
| Asthma | 13.0 |
| Cardio-vascular | 25.2 |
| Low Birth Weights | 53.8 |
| Socioeconomic Factor Indicators | — |
| Education | 13.1 |
| Housing | 44.5 |
| Linguistic | 29.5 |
| Poverty | 24.4 |
| Unemployment | 18.3 |

## 7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

| Indicator | Result for Project Census Tract |
|---|---|
| Economic | — |
| Above Poverty | 66.99602207 |
| Employed | 46.86256897 |
| Median HI | 74.75939946 |
| Education | — |
| Bachelor's or higher | 73.18105993 |
| High school enrollment | 100 |

| | |
|---|---|
| Preschool enrollment | 38.32926986 |
| Transportation | — |
| Auto Access | 76.73553189 |
| Active commuting | 10.9842166 |
| Social | — |
| 2-parent households | 76.08109842 |
| Voting | 82.47144874 |
| Neighborhood | — |
| Alcohol availability | 79.69973053 |
| Park access | 5.607596561 |
| Retail density | 16.39933273 |
| Supermarket access | 34.96727833 |
| Tree canopy | 32.02874374 |
| Housing | — |
| Homeownership | 78.53201591 |
| Housing habitability | 76.35057103 |
| Low-inc homeowner severe housing cost burden | 10.31695111 |
| Low-inc renter severe housing cost burden | 88.6179905 |
| Uncrowded housing | 74.48992686 |
| Health Outcomes | — |
| Insured adults | 59.70742974 |
| Arthritis | 21.6 |
| Asthma ER Admissions | 87.5 |
| High Blood Pressure | 28.2 |
| Cancer (excluding skin) | 14.0 |
| Asthma | 72.9 |
| Coronary Heart Disease | 37.1 |

| | |
|---|---|
| Chronic Obstructive Pulmonary Disease | 56.7 |
| Diagnosed Diabetes | 60.0 |
| Life Expectancy at Birth | 89.2 |
| Cognitively Disabled | 76.7 |
| Physically  Disabled | 74.5 |
| Heart Attack ER Admissions | 86.7 |
| Mental Health Not Good | 79.6 |
| Chronic Kidney Disease | 55.3 |
| Obesity | 74.1 |
| Pedestrian Injuries | 19.6 |
| Physical Health Not Good | 69.2 |
| Stroke | 51.7 |
| Health Risk Behaviors | — |
| Binge Drinking | 66.7 |
| Current Smoker | 80.3 |
| No Leisure Time for Physical Activity | 73.6 |
| Climate Change Exposures | — |
| Wildfire Risk | 0.0 |
| SLR Inundation Area | 0.0 |
| Children | 75.0 |
| Elderly | 12.2 |
| English Speaking | 29.9 |
| Foreign-born | 43.9 |
| Outdoor Workers | 76.1 |
| Climate Change Adaptive Capacity | — |
| Impervious Surface Cover | 75.2 |
| Traffic Density | 79.1 |

| | |
|---|---|
| Traffic Access | 23.0 |
| Other Indices | — |
| Hardship | 23.0 |
| Other Decision Support | — |
| 2016 Voting | 84.6 |

## 7.3. Overall Health & Equity Scores

| Metric | Result for Project Census Tract |
|---|---|
| CalEnviroScreen 4.0 Score for Project Location (a) | 37.0 |
| Healthy Places Index Score for Project Location (b) | 64.0 |
| Project Located in a Designated Disadvantaged Community (Senate Bill 535) | No |
| Project Located in a Low-Income Community (Assembly Bill 1550) | No |
| Project Located in a Community Air Protection Program Community (Assembly Bill 617) | No |

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

## 7.4. Health & Equity Measures

No Health & Equity Measures selected.

## 7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

## 7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

# 8. User Changes to Default Data

| Screen | Justification |
|---|---|
| Land Use | Taken from Site plan |
| Construction: Construction Phases | OY 2025, used previous AQ report construction schedule |

| | |
|---|---|
| Construction: Off-Road Equipment | T/L/B replaced with Crawler Tractor to accurately calculate disturbance for Site Preparation and Grading phases<br>Standard 8-hour work days |
| Operations: Vehicle Data | Taken from ITE weekend trip rates LU 210 |
| Operations: Hearths | Woodstoves - Rule 445 no wood burning devices, Wood burning devices added to gas devices |
| Operations: Refrigerants | Beginning 1 January 2025, all new air conditioning equipment may not use refrigerants with a GWP of 750 or greater. |

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# APPENDIX D-1

# BIOLOGICAL RESOURCES TECHNICAL REPORT

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# BIOLOGICAL RESOURCES TECHNICAL REPORT
# Villa Serena Specific Plan (Tract No. 20245) Project

**Prepared for:**

City of Upland, Development Services Department
460 N. Euclid Avenue
Upland, CA 91786

**Prepared by:**

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**January 2023**

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Attachment 4: Special-Status Species Not Addressed
Attachment 5: Project Species List
Attachment 6: Project Photos

## Appendices

Appendix A: San Bernardino Kangaroo Rat and California Gnatcatcher Habitat Assessment for a 19-acre parcel located in Upland, San Bernardino County, California.

# 1.0 Introduction

This report was prepared by Aspen Environmental Group (Aspen) to describe the biological resources at the Villa Serena Specific Plan (Tract No. 20245) Project (project). The project is located within 15th Street Basin within the City of Upland, California. The Colonies Partners, LLC. proposes to develop approximately 9.16 acres of the property and construct 65 houses. Throughout this report, "project" refers to the proposed residential development of a portion of 15th Street Basin, while "project site" refers to all areas that may be directly or indirectly impacted by project activities as well as a larger survey area that encompasses 15th Street Basin. This report provides baseline information on biological resources to support the regulatory review and permitting process.

# 2.0 Project and Property Description

## 2.1 Project Description

The Colonies Partners, LLC proposes to construct 65 single-family residential dwellings on 9.16 acres of the existing 20.3-acre 15th Street Basin. In addition to the residential dwellings, the project will also construct a community pool, pool house, restrooms, picnic tables, and utility connections. The total impact area included in this report is 22.1 acres which includes temporary impact areas and additional improvements to infrastructure beyond the limits of 15th Street Basin. Approximately 4.3 acres of 15th Street Basin will remain as a functioning flood control basin and will be excavated to increase its storage capacity. The basin will also be preserved and enhanced to off-set the loss of riparian and wetland vegetation.

## 2.2 Project Location

The project is approximately 22.1-acres and is located on the northeast corner of the intersection of Fernando Avenue and E. 15th Street in the City of Upland, California (APN: 3105-171-08). The project site is located in Section 23, Township 1 South, Range 5 West (USGS Ontario, CA 7.5-minute quadrangle) (Figure 1, Attachment 1). The project site is surrounded by existing single family residential housing developments to the south, east, and west with Upland hills Country Club to the north. Dry Dock Depot Boat and RV Storage and Sothern California Edison Padua Station are located to the southwest and northwest of Campus Avenue.

# 3.0 Methods

## 3.1 Literature Review

Prior to conducting field surveys, Aspen biologists reviewed available literature to identify special-status biological resources known from the vicinity of the project site. The literature and databases listed below were reviewed.

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) for the project site (USFWS 2022).
- CNDDB (CDFW 2022a) for the following 7.5-minute USGS topographic quads within 5-miles of the project: Mt. Baldy, Ontario, Glendora, San Dimas, Guasti, Cucamonga Peak, Yorba Linda, Prado Dam, and Corona North.

- CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2022), for the same topographic quads.
- General Biological Resources Assessment, Upland, San Bernardino County, California, APN: 3105-171-08 (RCA Associates, Inc., 2022).

The CNDDB results are listed in Attachment 2 and the IPaC Resource List is provided as Attachment 3. Several special-status species identified during the literature review only occur in specialized native habitats that are absent from the project site or occur at higher or lower elevations. These plants and animals are listed in Attachment 4 but are not addressed further in this report.

## 3.2 Field Surveys

Field surveys were conducted on January 25, February 16, March 16, April 3, and April 22, 2022, by RCA Associate, Inc. biologists, to evaluate project impacts to vegetation and wildlife species. Aspen biologists Justin Wood and Jacob Aragon visited the project site on June 24 and August 15, 2022, to conduct a focused botanical survey, map vegetation, and conduct general wildlife surveys. Lastly, permitted biologist Mikael Romich, of Origin Biological conducted a habitat assessment for California gnatcatcher and San Bernardino kangaroo rat on the project site on June 3 and July 1, 2022 (see Appendix A).

During the surveys, biologists conducted 100 percent coverage biological survey of the project site. During the field surveys, all plant and wildlife species observed were recorded in field notes and special-status species locations were recorded using hand-held GPS units. All plant and wildlife species observed during the surveys are listed in Attachment 5. Representative site photos were captured during the survey and are included in Attachment 6.

The botanical surveys were conducted in conformance with California Department of Fish and Wildlife (CDFW) guidelines (CDFW 2018). The surveys were (a) conducted during flowering seasons for the special status plants known from the area, (b) floristic in nature, (c) consistent with conservation ethics, (d) systematically covered all habitat types on the sites, and (e) well documented by this report and by voucher specimens to be deposited at California Botanic Garden (formerly Rancho Santa Ana Botanic Garden) and other herbaria. Plants of uncertain identity were collected and identified later using keys, descriptions, and illustrations in Baldwin et al. (2012).

Vegetation mapping was done by drawing tentative boundaries onto high-resolution aerial images during site visit on June 24, 2022. These boundaries were then digitized into Geographic Information System (GIS) shapefiles. Vegetation maps were field verified for accuracy on August 15, 2022 (see Attachment 1; Figure 2: Vegetation and Land Cover). Vegetation within the project site is further described below using the names and descriptions in *A Manual of California Vegetation* (Sawyer et al., 2009). Vegetation was mapped digitally using ArcGIS (version 10.7) and one-foot pixel aerial imagery. The smallest mapping unit was approximately 0.05-acre and most mapped vegetation boundaries are accurate to within approximately 5-ft. Any vegetation map is subject to imprecision for several reasons:

1. Vegetation types tend to intergrade on the landscape so that there are no true boundaries in the vegetation itself. In these cases, a mapped boundary represents best professional judgment.
2. Vegetation types as they are named and described tend to intergrade; that is, a given stand of real-world vegetation may not fit into any named type in the classification scheme used. Thus, a mapped and labeled polygon is given the best name available in the classification, but this name does not imply that the vegetation unambiguously matches its mapped name.

3. Vegetation tends to be patchy. Small patches of one named type are often included within mapped polygons of another type. The size of these patches varies, depending on the minimum mapping units and scale of available aerial imagery.

**Rainfall:** Rainfall is greatest during the months of November through March, with an average annual precipitation total of 17.16 inches, as reported in north Claremont, approximately 4 miles west of the project site (Los Angeles County 2022). Rainfall to-date has been lower than average with approximately 14.33 inches falling in the region since October 2, 2021 (Los Angeles County 2022).

# 4.0 General Biological Survey Results

## 4.1 Vegetation and Cover Types

Vegetation within the project site consists of riparian and wetland vegetation, upland vegetation, and other land cover types. Some of the native species observed include mulefat (*Baccharis salicifolia*), coast live oak (*Quercus agrifolia*), broadleaf cattail (*Typha latifolia*), marsh purslane (*Ludwigia peploides*), California buckwheat (*Eriogonum fasciculatum*), coastal sage brush (*Artemisia californica*), scale broom (*Lepidospartum squamatum*), and black sage (*Salvia mellifera*). The vegetation and land covers within the project site are described in detail below and acreages of the vegetation and land cover types are presented in Table 1 and shown in Figures 2 (Attachment 1).

**Table 1. Vegetation and Other Cover Types on the Project Site (acres)**

| Vegetation Type | Development Area (Acres) | Conservation Area (Acres) | Project Site (Acres) |
|---|---|---|---|
| California buckwheat scrub | 5.39 | 2.55 | 7.94 |
| Cattail marshes | 0.08 | 0.18 | 0.25 |
| Eucalyptus - tree of heaven - black locust groves | 0.89 | 0.64 | 1.53 |
| Mulefat scrub | -- | 0.17 | 0.17 |
| Scale broom scrub | 0.14 | -- | 0.14 |
| **Other Cover Types** | | | |
| Developed | 11.30 | 0.74 | 12.04 |
| **Total** | **17.79** | **4.29** | **22.08** |

### Riparian and Wetland Vegetation Types

**Cattail marshes (*Typha* (*angustifolia*, *domingensis*, *latifolia*) Herbaceous Alliance).** Cattail marshes are wetland vegetation that is dominated by broadleaf cattail (*Typha latifolia*). Additional species such as marsh purslane (*Ludwigia peploides*), watercress (*Nasturtium officinale*), seep monkeyflower (*Mimulus guttatus*), Dallis grass (*Paspalum dilatatum*), cocklebur (*Xanthium strumarium*), and Spanish sunflower (*Pulicaria paludosa*) are also present. Cattail marshes are present in the low-lying portions of the project site that accumulate runoff and storm flows from the adjacent golf course and watershed. Cattail marshes have a State rank of S5 and are therefore not recognized as a sensitive natural community by CDFW (CDFW 2022c).

**Mulefat thickets (*Baccharis salicifolia* Shrubland Alliance).** Mulefat thickets are a winter deciduous shrubland that are dominated by mulefat. Additional species such as Gooding's black willow (*Salix gooddingii*), Chinese elms (*Ulmus parvifolia*), and California sycamore (*Platanus racemosa*) are also present. The mulefat thickets are present within the Conservation Area, along the northern and southern

edges of the basin floor. Mulefat thickets have a State Rank of S4 and are therefore not recognized as a sensitive natural community by CDFW (CDFW 2022c).

### Upland Vegetation Types

**California buckwheat scrub (*Eriogonum fasciculatum* Shrubland Alliance).** California buckwheat scrub is a type of coastal sage scrub dominated by California buckwheat. Other species such as pine bush (*Ericameria pinifolia*), broom baccharis (*Baccharis sarothroides*), coastal sage brush, black sage , showy penstemon (*Penstemon spectabilis*), and holly leaf cherry (*Prunus ilicifolia*) are also present. California buckwheat scrub is the most common native vegetation within the project site and most of it is in the Conservation Area. California buckwheat scrub has a State rank of S5 and are therefore not recognized as a sensitive natural community by CDFW (CDFW 2022c).

**Eucalyptus - tree of heaven - black locust groves (*Eucalyptus* spp. - *Ailanthus altissima* - *Robinia pseudoacacia* Woodland Semi-Natural Alliance).** Eucalyptus - tree of heaven - black locust groves are used to map all vegetation dominated by non-native trees within the project site including gum trees (*Eucalyptus* spp.), crepe myrtle (*Lagerstroemia indica*), goldenrain tree (*Koelreuteria bipinnata*), and others. Native tree species such as California sycamore and coast live oak are also present but generally represent single trees and not a continuous canopy. Eucalyptus - tree of heaven - black locust groves have a State Rank of SNA (Not Applicable) and are therefore not recognized as a sensitive natural community by CDFW (CDFW 2022c).

**Scale broom scrub (*Lepidospartum squamatum* Shrubland Alliance).** Scale broom scrub is a type of alluvial fan sage scrub or coastal sage scrub dominated by scale broom. Other species such as California buckwheat and deerweed (*Acmispon glaber*) are also present in low numbers. Scale broom scrub is present on one slope within the Development Area. It is likely a remnant stand of a vegetation type that was once much more common in the region. Scale broom scrub has a State Rank of S3 and is therefore recognized as a sensitive natural community by CDFW (CDFW 2022c).

### Other Cover Types

**Developed.** This cover type includes disturbed and developed areas within the project site including unpaved roads, drainage structures, and the unvegetated slopes and basin floors. Sparse vegetation is present and includes weedy species such as wild oat (*Avena* spp.), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), mustard (*Hirschfeldia incana*), and tocalote (*Centaurea melitensis*). Developed is not a vegetation type and is therefore not described in *A Manual of California Vegetation* and is also not recognized as a sensitive natural community by CDFW (CDFW 2022c).

## 4.2 Sensitive Natural Communities

Sensitive vegetation communities are defined by CDFW (2018) as, "...communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects." The literature review identified ten sensitive vegetation communities recorded near the project site. These include canyon live oak ravine forest, coastal and valley freshwater marsh, southern California arroyo chub/Santa Ana sucker stream, southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern sycamore alder riparian woodland, southern willow scrub, Riversidean alluvial fan sage scrub, California walnut woodland, walnut forests (CDFW 2022a). Of these, Riversidean alluvial fan sage scrub is the only one present on the project site and is mapped as scale broom scrub, an equivalent vegetation described above.

## 4.3 Wildlife Habitat

The term habitat refers to the environment and ecological conditions where a species is found. Wildlife habitat is often described in terms of vegetation, though a more thorough explanation includes detail such as availability or proximity to water, suitable nesting or denning sites, shade, foraging perches, cover sites to escape from predators, soils that are suitable for burrowing or hiding, proximity of noise and disturbance, and other factors that are unique to each species. For many wildlife species, vegetation reflects important components of habitat, including regional climate, physical structure, and biological productivity and food resources. Thus, the vegetation descriptions in Section 4.1 are useful overarching descriptors for wildlife habitat.

Wildlife and wildlife sign observed during the field surveys included species common in the region, such western fence lizard (*Sceloporus occidentalis*), black phoebe (*Sayornis nigricans*), lesser goldfinch (*Spinus psaltria*), house finch (*Haemorhous mexicanus*), turkey vulture (*Cathartes aura*), coyote (*Canis latrans*), and California ground squirrel (*Otospermophilus beecheyi*). Other common wildlife species that were not observed but are likely to be present include mallard (*Anas platyrhynchos*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), common yellow throat (*Geothlypis trichas*), Pacific chorus frog (*Pseudacris regilla*), western toads (*Anaxyrus boreas*), bobcats (*Lynx rufus*), racoon (*Procyon lotor*), opossum (*Didelphis marsupialis*), striped skunks (*Mephitis mephitis*), desert cottontail (*Sylvilagus audubonii*), and numerous small mammals and invertebrates. Two special-status wildlife species were observed or otherwise detected during the surveys and are discussed below in Section 5.0.

# 5.0 Special-Status Species Results

Based on review of the literature and databases listed above, and on local expertise with the flora and fauna of the project site, lists of special-status plants and wildlife with potential to occur on the project site or in the project vicinity were compiled (Table 3). Plant and wildlife taxa were considered to be special-status species if they were classified in one or more of the categories listed in Table 2. All special-status plants and wildlife occurring in the region in habitats similar to those found on the project site are addressed in Table 3, with brief descriptions of habitat and distribution, conservation status, and probability of occurrence on the site.

**Table 2. Definitions of Special-Status Species**

| Species Designation | Agency | Definition |
|---|---|---|
| Federal Endangered | USFWS | A species that is in danger of extinction throughout all or a significant portion of its range. |
| Federal Threatened | USFWS | A species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. |
| Federal Candidate | USFWS | A species the US Fish and Wildlife Service (USFWS) has designated as a candidate for listing under Section 4 of the federal Endangered Species Act (ESA), published in its annual candidate review, and defined as a species that has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. |
| Federal Proposed | USFWS | A species that the USFWS has proposed for listing under Section 4 of the ESA, by publishing a Proposed Rule in the Federal Register. |

**Table 2. Definitions of Special-Status Species**

| Species Designation | Agency | Definition |
|---|---|---|
| Protected under the federal Bald and Golden Eagle Protection Act (BGEPA) | USFWS | Bald and golden eagles are protected from take, including harassment, except as permitted by USFWS. |
| State Endangered | CDFW | A species that is in serious danger of becoming extinct throughout all or a significant portion of its range due to one or more causes, including loss or change in habitat, overexploitation, predation, competition, or disease. |
| State Threatened | CDFW | A species that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts. |
| State Candidate | CDFW | A species that has been officially noticed by the California Fish and Game Commission as being under review by the CDFW for addition to the threatened or endangered species lists. CDFW candidate species are given no extra-legal protection under state laws. |
| Fully Protected | CDFW | Animal species fully protected under the California Fish and Game Code. The CDFW may not issue take authorization except for scientific purposes or as provided under SB 618 (2011). |
| Species of Special Concern | CDFW | A species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:<br>Is extirpated from the state or, in the case of birds, in its primary seasonal or breeding role.<br>Is on the federal, but not state list, of threatened or endangered species. Meets the state definition of threatened or endangered but has not formally been listed.<br>Is experiencing or formerly experienced serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; or<br>Has naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized, could lead to declines that would qualify it for state threatened or endangered status.<br>This is an administrative designation and carries no formal legal status. This designation is intended to focus attention on animals at conservation risk, to stimulate research on poorly known species, and to achieve conservation and recovery before these species meet the California Endangered Species Act (CESA) criteria for listing. California Species of Special Concern are considered under the California Environmental Quality Act (CEQA) and require a discussion of impacts and appropriate mitigation to reduce impacts. |
| Watch List | CDFW | Taxa that were previously Species of Special Concern, but no longer merit that status or which do not meet criteria for designation as Species of Special Concern, but for which there is concern and a need for additional information to clarify status. |
| Special Animal | CDFW | An animal species that is tracked in the CNDDB but has no other status at the state or federal level. |
| California Rare Plant Rank (CRPR) 1A | CDFW | Plants presumed to be extinct in California. |
| CRPR 1B | CDFW | Plants rare or endangered in California and elsewhere. |
| CRPR 2A | CDFW | Plants presumed extinct in California but more common elsewhere. |

**Table 2. Definitions of Special-Status Species**

| Species Designation | Agency | Definition |
|---|---|---|
| CRPR 2B | CDFW | Plants rare or endangered in California but more common elsewhere. |
| CRPR 3 | CDFW | Plants about which more information is needed – a review list. |
| CRPR 4 | CDFW | Plants of limited distribution – a watch list. |

Plants or wildlife may be ranked as special-status species due to declining populations, vulnerability to habitat change, or restricted distributions. Certain species have been listed as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA). Others have not been listed, but declining populations or habitat availability cause concern for their long-term viability. These species of conservation concern appear on lists compiled by resource agencies or private conservation organizations. In this report, "special-status species" includes all plants and wildlife listed as threatened or endangered or included in these other compilations. All special-status plants and wildlife occurring in the region in habitats similar to those found on the project site are addressed in Table 3, with brief descriptions of habitat and distribution, conservation status, and probability of occurrence on the site.

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| **PLANTS** | | | | |
| *Berberis nevinii*<br>Nevin's barberry | A shrub native to California, riparian, coastal sage scrub and chaparral. 230-2,705 ft elev. Santa Barbara, Ventura, Los Angeles, Orange, San Bernardino, Riverside, San Diego, and Imperial Cos. | Mar-Jun | Fed: **END**<br>CA: 1B.1 | **Low:** suitable habitat is present, known several locations in Claremont about 4.5 miles northwest of the project site. |
| *Calochortus plummerae*<br>Plummer's mariposa-lily | Perennial herb (bulb); chaparral, alluvial fans, pine forest, below about 5600 ft. elev.; widespread but uncommon throughout S. Calif. mts., foothills & valleys. | May–Jul | Fed: None<br>CA: S4, 4.2 | **Low:** suitable habitat is present, known several locations in Claremont about 4.5 miles northwest of the project site. |
| *Calystegia felix*<br>Lucky morning-glory | Annual herb; alkaline meadows, riparian scrub. 100-700 ft elev.; Los Angeles, Orange, San Bernardino, and Riverside Cos. | Mar-Sep | Fed: None<br>CA: S1, 1B.1 | **Low**: Marginally suitable wetland habitat present, nearest known occurrence about 8 miles to the south. |
| *Chorizanthe parryi* var. *parryi*<br>Parry's spineflower | Annual herb, dry slopes and flats in coastal scrub, chaparral, cismontane woodlands. 295-4000 ft. elev.: Ventura, Los Angeles, San Bernardino, Riverside and San Diego Cos. | Apr-Jun | Fed: None<br>CA: S2, 1B.1 | **Moderate**: Marginally suitable habitat present, nearest known occurrence about 5 miles to the west and east. |

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| *Horkelia cuneata* var. *puberula*<br>Mesa horkelia | Perennial herb; shrublands, woodlands; sandy soils, away from immediate coast; San Luis Obispo to San Diego Co., rarely inland to San Bernardino Co.; about 200-2700 ft. elev. | Apr–Sep | Fed: None<br>CA: S1, 1B.1 | **Low**: Marginally suitable habitat present, about 4.2 miles from nearest known occurrence. |
| *Imperata brevifolia*<br>California satintail | Perennial grass-like herb; mesic sites, alkali seeps, coastal sage scrub, chaparral, wetlands and non-wetlands. <1640 ft elev. Santa Barbara down to San Diego Cos. | Jun-Aug | Fed: None<br>CA: S3 2B.1 | **Low**: Marginally suitable wetland habitat present, nearest known occurrence about 20 miles to the east. |
| *Lepidium virginicum* var. *robinsonii*<br>Robinson's pepper-grass | Annual herb; dry soils in chaparral, coastal sage scrub. 5-2,902 ft. elev.; Ventura, Santa Barbara, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego Cos. | Jan-Jul | Fed: None<br>CA: S3, 4.3 | **Moderate**: Marginally suitable habitat present, nearest known occurrence about 5 miles to the west and east. |
| *Juglans californica*<br>Southern California black walnut | A native, dicot tree occurring in southern oak woodlands from 165-2,955 ft elev; Santa Barbara, Ventura, Kern, Los Angeles, San Bernardino, Orange, Riverside and San Diego Cos. | Mar-Aug | Fed: None<br>CA: S4, 4.2 | **Moderate**: Marginally suitable habitat present, nearest known occurrence about 3 miles to the west. |
| *Pseudognaphalium luecocephalum*<br>White rabbit-tobacco | Perennial herb, sandy or gravelly benches, dry stream and canyon bottoms of chaparral and coastal sage scrub. 0-6,890 ft. elev.; Ventura, Los Angeles, San Bernardino, Riverside, Orange and San Diego Cos. | Aug-Nov | Fed: None<br>CA: S2, 2B.2 | **Low**: Marginally suitable habitat present, more than 5 miles from nearest known occurrence. |
| *Sagittaria sanfordii*<br>Sanford's arrowhead | Perennial herb (rhizomatous) occurring in wetlands, freshwater marshes, riparian. 0-2,135 ft. elev.; Los Angeles, Orange and San Bernardino Cos. | Mar-Oct | Fed: None<br>CA: S3, 1B.2 | **Low**: Marginally suitable wetland habitat present, nearest known occurrence about 3 miles to the northeast. |
| **INVERTEBRATES** | | | | |
| *Bombus crotchii*<br>Crotch bumble bee | Colonial insect; open grassland and scrub; underground colonies, often in old rodent burrows. Many food plants including *Chaenactis, Lupinus, Phacelia, Salvia*, and *Eriogonum*. Much of southern and central CA, SW Nevada and Baja. | Spring – Summer | Fed: None<br>CA: S1S2 | **Moderate**: Suitable habitat and food plants present; historical records from within about 2 miles. |
| *Danaus plexippus* pop. 1<br>Monarch – California overwintering population | Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Closed-cone coniferous forest | Year-round | Fed: **CAN**<br>CA: S2 | **High**; not observed, likely to be present however they are unlikely to overwinter this far inland. |
| **REPTILES** | | | | |

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| *Anniella stebbinsi*<br>Southern California legless lizard | Generally, south of the Transverse Range, south to NW Baja Calif. Sandy or loose loamy soils under sparse vegetation; soils typically have high moisture content. | Year-round | Fed: None<br>CA: S3, CSC | **Low**: Marginally suitable habitat present, nearest known occurrence about 5 miles. |
| *Aspidoscelis tigris stejnegeri*<br>Coastal whiptail | Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Coastal Calif., Transverse, and Peninsular ranges, south to Baja Calif. | Year-round | Fed: None<br>CA: S3, CSC | **Present**. Three individuals observed in the project site. |
| *Phrynosoma blainvillii*<br>Coast horned lizard | Forest, shrubland or grassland; sandy soils; W Calif. from LA Co S through N Baja Calif., below about 6000 ft. elev. | Spring – Summer | Fed: None<br>CA: S3S4, CSC | **Low**: Minimally suitable habitat present, historical records from within about 2 miles. |
| **BIRDS** | | | | |
| *Accipiter cooperii*<br>Cooper's hawk | Nests in forest and woodland, hunts in woods and open areas; breeds through most of US, winters south through Mexico | Year-round | Fed: None<br>CA: S4 (nesting), WL | **Moderate** (nesting): **Present** (foraging); suitable nesting habitat present;1 individual observed foraging within the project site. |
| *Agelaius tricolor*<br>Tricolored blackbird | Highly colonial species; requires open water, protected nesting substrate, and foraging areas with insect prey within a few kilometers of colony. | Year-round | Fed: None<br>CA: **THR**, S1S2, CSC | **Low** (nesting): **Moderate** (foraging); limited nesting habitat; historical records from within about 5 miles. |
| *Aimophila ruficeps canescens*<br>Southern California rufous-crowned sparrow | Coastal sage scrub, open chaparral; S Calif. and NW Baja Calif.; not migratory | Year-round | Fed: None<br>CA: S3, WL | **Moderate**: Suitable habitat present; historical records from within about 5 miles. |
| *Aquila chrysaetos*<br>Golden eagle | Nests in remote trees and cliffs; forages over shrublands and grasslands; breeds throughout W N America, winters to E coast | Year-round | Fed: Eagle Protection Act<br>CA: S3, FP | **Minimal** (nesting), **Low** (foraging); no suitable nesting habitat, minimal suitable foraging habitat present. |
| *Athene cunicularia*<br>Burrowing owl | Nests mainly in rodent burrows, usually in open grassland or shrubland; forages in open habitat; increasingly uncommon in S Calif.; through W US and Mexico | Year-round | Fed: None<br>CA: S3, CSC | **Moderate** suitable habitat present, historical records from within about 2 miles. |

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| *Buteo swainsonii*<br>Swainson's hawk | Breeds in open habitats (e.g., grassland), Central Valley and W Mojave Desert (Calif.) and east to cent. US, S. Canada, New Mexico; winters in S America | Spring – Summer | Fed: None<br>CA: **THR**, S3 | **Minimal** (nesting), **Moderate** (foraging); no suitable nesting habitat, suitable foraging habitat present during migration only. |
| *Elanus leucurus*<br>White-tailed kite | Typically nests at lower elevations in riparian trees, including oaks, willows, and cottonwoods; forages over open country. Throughout much of cismontane California. | Spring – Summer | Fed: None<br>CA: S3S4, FP | **Minimal** (nesting); **Moderate** (foraging); no suitable nesting habitat; marginal foraging habitat, known within 5 miles. |
| *Eremophila alpestris actia*<br>California horned lark | Open, flat lands incl. sparse sagebrush or grassland, meadows, alkali flats; wide elev. range; breeds in western Calif (San Diego Co through Humboldt Co) and Baja Calif; winters in same range. | Year-round | Fed: None<br>CA: S4, WL | **Low** (nesting); **Moderate** (foraging); Minimally suitable nesting habitat, marginal foraging habitat present. |
| *Falco columbarius*<br>Merlin | Uncommon wintering species in S Calif. desert and valleys (breeds in northern N America and Eurasia). | Winter | Fed: None<br>CA: S3S4, WL (winter) | **Minimal** (nesting): **Low** (foraging); nesting habitat absent known to winter in the region. |
| *Icteria virens*<br>Yellow-breasted chat | Inhabits riparian thickets of willow and other brushy tangles near water courses; nests in low, dense riparian vegetation; nests and forages within 10 feet of ground. | Spring – Summer | Fed: None<br>CA: S3, CSC | **Moderate:** suitable habitat present, known from within 0.7 miles of the project site. |
| *Polioptila californica californica*<br>Coastal California gnatcatcher | Primarily coastal sage scrub below about 2,000 feet elev.; southwestern California, Ventura County to northern Baja California; inland to San Gorgonio Pass area (e.g., Banning) | Year-round | Fed: **THR**<br>CA: S2, CSC | **Low**: marginally suitable habitat is present, nearest record is about 5 miles west. |
| *Setophaga petechia*<br>Yellow warbler | Breeds in willow and cottonwood riparian habitat, near sea level to 9000 ft. elev.; much of N Amer.; sensitive in S Calif. due to habitat loss & cowbird parasitism; winters Mexico to S Amer. | Spring – Summer | Fed: None<br>CA: S3S4, CSC (nesting) | **Moderate:** suitable habitat present, known from within less than 0.5 miles of the project site. |
| *Vireo bellii pusillus*<br>Least Bell's vireo | Summer resident of southern California in low riparian habitats in vicinity of water or dry river bottoms; found below 2000 ft; nests placed along margins of bushes or on twigs projecting into pathways, usually willow, mesquite, and mulefat. | Spring–Fall | Fed: **END**<br>CA: **END**, S2 | **Low:** suitable habitat present, known from Cucamonga Basin approximately 0.7 miles north of the project site. |
| **MAMMALS** | | | | |

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| *Antrozous pallidus*<br>Pallid bat | Desert, grassland, shrubland, woodland, forest; most common in open, dry habitats with rocky areas for roosting. | Spring – Summer | Fed: None<br>CA: S3, CSC | **Minimal** (roosting); **Low** (foraging). Suitable foraging habitat is present; suitable roosting habitat is absent. |
| *Eumops perotis californicus*<br>Western mastiff bat | Lowlands (with rare exceptions); cent. and S Calif., S Ariz., NM, SW Tex., N Mexico; roost in deep rock crevices, forage over wide area. | Year-round | Fed: None<br>CA: S3S4, CSC | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |
| *Lasiurus cinereus*<br>Hoary bat | Prefers deciduous and coniferous woodlands, primarily roosts in tree foliage. Widespread throughout most of North America into Central America. | Year-round | Fed: None<br>CA: S4 | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |
| *Lasiurus xanthinus*<br>Western yellow bat | Roosts in trees, particularly palms. Forages over water and trees in valley foothill riparian, desert riparian, washes. Southern California, Mexico and Central America. | Year-round | Fed: None<br>CA: S3, CSC | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |
| *Lepus californicus bennettii*<br>San Diego black-tailed jackrabbit | Arid regions with short grass, agricultural fields, and sparse coastal sage scrub. Western United States from Washington to Southern California, east to Nebraska and Texas. | Year-round | Fed: None<br>CA: S3S4 | **Low:** suitable habitat present, historical records from within about 5 miles. |
| *Myotis yumanensis*<br>Yuma myotis | Widespread in CA, uncommon in deserts, many habitats, sea level to 3300 m (11,000 ft), but uncommon above 2560 m (8000 ft); feeds over open water. | Year-round | Fed: None<br>CA: S4 | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |
| *Neotoma lepida intermedia*<br>San Diego desert woodrat | Coastal scrub with a moderate to dense canopies preferred. Particularly abundant in rock outcrops, rocky cliffs, and slopes. So. California from San Diego to San Luis Obispo Cos. | Year-round | Fed: None<br>CA: S3S4, CSC | **Moderate**: suitable habitat is present, nearest known occurrence is within about 2 miles of the project site. |
| *Nyctinomops femorosaccus*<br>Pocketed tree-tailed bat | Variety of arid areas, pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian. Rocky areas with high cliffs. | Year-round | Fed: None<br>CA: S3, CSC | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |

**Table 3. Special-Status Species Addressed**

| Species Name | Habitat Requirements | Flowering or Activity Season | Conservation Status | Potential to Occur |
|---|---|---|---|---|
| *Nyctinomops macrotis* Big free-tailed bat | Primarily desert bats, roosts in crevices of cliffs and rocky outgroups. Southwestern United States and western Mexico. | Year-round | Fed: None CA: S3, CSC | **Minimal** (roosting): **Low** (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present. |

General references (botany): Baldwin et al., 2012; CDFW, 2022a; CDFW, 2022b; CNPS, 2022; and CCH, 2022. General references (wildlife): American Ornithologists Union, 1998 (including supplements through 2013); Barbour and Davis, 1969; Ebird.org, 2022; Feldhamer et al., 2003; Garrett and Dunn, 1981; Hall, 1981; Jennings and Hayes, 1994; Stebbins, 2003; Wilson and Ruff, 1999; and Zeiner et al., 1990.

**Conservation Status**

***Federal designations* (*Fed*):** (federal ESA, USFWS).

END: Federally listed, endangered.
THR: Federally listed, threatened.
Candidate: Sufficient data are available to support federal listing, but not yet listed.
Proposed: Formally proposed for the federal status shown.
BGEPA: Bald and Golden Eagle Protection Act
DEL: Delisted

***State designations* (*CA*):** (CESA, CDFW)

END: State listed, endangered.
THR: State listed, threatened.
CAND. Sufficient data are available to support federal listing, but not yet listed.
RARE: State listed as rare (applied only to certain plants).
CSC: California Species of Special Concern. Considered vulnerable to extinction due to declining numbers, limited geographic ranges, or ongoing threats.
WL: Species that were either previously listed as SC and have not been state listed under CESA; or were previously state or federally listed and now are on neither list; or are on the list of "Fully Protected" species.
FP: Fully protected. May not be taken or possessed without permit from CDFW.

***CDFW Natural Diversity Data Base Designations:*** Applied to special-status plants and sensitive plant communities; where correct category is uncertain, CDFW uses two categories or question marks.

S1: Fewer than 6 occurrences or fewer than 1000 individuals or less than 2000 acres.
S1.1: Very threatened
S1.2: Threatened
S1.3: No current threats known
S2: 6-20 occurrences or 1,000-3,000 individuals or 2,000-10,000 acres (decimal suffixes same as above).
S3: 21-100 occurrences or 3,000-10,000 individuals or 10,000-50,000 acres (decimal suffixes same as above).
S4: Apparently secure in California; this rank is clearly lower than S3 but factors exist to cause some concern, i.e., there is some threat or somewhat narrow habitat. No threat rank.
S5: Demonstrably secure or ineradicable in California. No threat rank.
SH: All California occurrences historical (i.e., no records in > 20 years).
SX: Presumed extirpated in California.

***California Rare Plant Rank designations.*** Note: According to the California Native Plant Society (http://www.cnps.org/cnps/rareplants/ranking.php), plants ranked as CRPR 1A, 1B, and 2 meet definitions as threatened or endangered and are eligible for state listing. That interpretation of the state Endangered Species Act is not in general use.

1A: Plants presumed extinct in California.
1B: Plants rare and endangered in California and throughout their range.
2A: Plants presumed extinct in California but more common elsewhere in their range.
2B: Plants rare, threatened or endangered in California but more common elsewhere in their range.
3: Plants about which we need more information; a review list.
4: Plants of limited distribution; a watch list.

***California Rare Plant Rank Threat designation extensions:***

.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20-80% occurrences threatened)
.3 Not very endangered in California (<20% of occurrences threatened or no current threats known)

**Definitions of occurrence probability:** Estimated occurrence probabilities are based on literature sources cited earlier, field surveys, and habitat analyses reported here.

*Present:* Observed on the site by qualified biologists.
*High:* Habitat is a type often utilized by the species and the site is within the known range of the species.
*Moderate:* Site is within the known range of the species and habitat on the site is a type occasionally used.
*Low*: Site is within the species' known range but habitat is rarely used, or the species was not found during focused surveys covering less than 100% of potential habitat or completed in marginal seasons.
*Minimal*: No suitable habitat on the site; or well outside the species' known elevational or geographic ranges; or a focused study covering 100% of all suitable habitat, completed during the appropriate season and during a year of appropriate rainfall, did not detect the species.

## 5.1 Special-Status Plants

### 5.1.1 Listed Threatened or Endangered Plants

This section describes plant species reported from the region that are listed as threatened or endangered under the federal ESA or CESA and are present or have a potential to be present on the project site. Several listed plant species were identified during the literature review but none of these species were observed or found to have at least a moderate potential to occur. **No listed plant species are known from the project site, and none were observed during the surveys described in this report**.

### 5.1.2 Other Special-Status Plants

In addition to the federal and state endangered species regulations noted above, CDFW and CNPS maintain lists of plants of conservation concern. The CDFW compiles these species including CDFW and CNPS rankings as CRPR 1, 2, 3, or 4 in its compendium of "Special Plants" (CDFW 2022b). These plants are treated here as "special-status species" and are discussed below.

**Parry's spineflower (*Chorizanthe parryi* var. *parryi*).** Parry's spineflower has a CRPR of 1B.1 (CDFW, 2022a). It is an annual herb in the buckwheat (Polygonaceae) family. Parry's spineflower is endemic to southern California and occurs in Los Angeles, Ventura, San Bernardino, Riverside, and San Diego Counties. It is found on sandy or rocky soils in coastal scrub, chaparral, cismontane woodland, and alley and foothill grassland at elevations from 900 to 4,000 feet, and flowers from April to June (CNPS, 2022). Suitable habitat is present throughout much of the project site. Parry's spineflower is known from several extinct occurrences within about 5 miles of the project site. There is a low to moderate potential for this species to germinate and be present in the project site in a year with above average rainfall.

**California Rare Plant Rank (CRPR) 4 Species**. Two CRPR 4 species (i.e., a "watch list," not indicating rarity) have at least a moderate potential to occur. These include southern California black walnut (*Juglans californica*) and Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*). Both of these species are known from within five miles of the project site.

## 5.2 Special-Status Wildlife

### 5.2.1 Listed Threatened or Endangered Wildlife

This section includes species listed as threatened or endangered under CESA or FESA which were detected or have a high potential to be present on the project site. **No listed wildlife species are known from the project site, and none were observed during the surveys described in this report**. Three listed species and one candidate species have at least a moderate potential to be present and are discussed below.

**Least Bell's vireo (*Vireo bellii pusilus*).** Least Bell's vireo is listed as endangered under both the FESA and the CESA (CDFW 2022a). It is a small songbird that nests in riparian vegetation throughout much of southern California. Least Bell's vireo were once widespread in southern California, but their range was greatly reduced due to parasitism by brown-headed cowbirds concurrent with development of riparian habitats. Least Bell's vireo are known to nest at Cucamonga Basin, approximately 0.7 miles north of the project site. Suitable riparian habitat for least Bell's vireo is present on the project site and there is a low potential to be present. Protocol-level surveys were not completed as part of this report however multiple visits by qualified least Bell's vireo biologists were completed during the nesting season and no least Bell's vireo were detected.

**Coastal California gnatcatcher (*Polioptila californica californica*).** Coastal California gnatcatcher is listed as threatened under the FESA (CDFW 2022a). Its geographic range is primarily coastal southern California from Ventura County, inland to the Santa Clarita area, Banning area, and southward through northwestern Baja California. Its habitat is coastal sage scrub largely composed of California sagebrush, California buckwheat, and other low-growing, drought-deciduous shrubs. Coastal California gnatcatcher were once widespread in the region but are now very limited. They are now restricted to areas with larger, intact patches of coastal sage scrub such as near Puddingstone Reservoir and within the North Etiwanda Preserve, both more than 7 miles from the project site. Coastal California gnatcatcher have a low potential to be present on the project site. The nearest designated critical habitat for coastal California gnatcatcher is near Puddingstone Reservoir, about 7 miles to the west (USFWS 2007b).

**Swainson's Hawk (*Buteo swainsoni*).** Swainson's hawks are listed as threatened under the CESA (CDFW 2022a). In California, they nest in the San Joaquin Valley, western Antelope Valley, and Owens Valley. They migrate to South America every fall and return to California every spring. Swainson's hawks migrate along the Pacific flyway, and several have been observed in the vicinity of the project site during migration. Several Swainson's hawks have been reported from the region during migration (eBird.org 2022). The project site is well outside of the breeding range, but Swainson's hawks may migrate over the area biannually. Swainson's hawks have a moderate potential to be present during migration.

**Tricolored blackbird (*Agelaius tricolor*).** Tricolored blackbird is listed as threatened under the CESA (CDFW, 2022a). It is a highly colonial species that is nearly endemic to California. They have a fairly wide range in central and northern California but in southern California are much more restricted. They nest in emergent marshland vegetation such as cattails (*Typha* sp.) and tules (*Schoenoplectus* sp.). It has been observed at Puddingstone Reservoir and throughout the Chino Basin (CDFW 2022a, eBird.org 2022). It has not been observed on the project site, but the project site does provide limited nesting habitat and suitable foraging habitat. There is a moderate potential for tricolored blackbirds to forage on the project site and a low potential for nesting within the Conservation Area.

**Monarch (*Danaus plexippus* pop. 1).** Overwintering populations of monarch in California are a candidate for federal listing under the ESA. The listing would only protect these overwintering sites and not individual butterflies or their food plants. Monarch and their food plants are widespread in California and although milkweed was not seen on the project site, monarchs have a high potential to be present. Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico and roosts are generally located in wind-protected tree groves. The project site is likely too far inland to support winter roosting habitat.

### 5.2.2 Species Protected Under the Federal Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d; BGEPA) prohibits take of bald eagles and golden eagles. The BGEPA defines *take* to include "pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing." The USFWS (2007a) further defines *disturb* as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Both bald eagle and golden eagle are observed periodically in the region but are not expected to utilize the project site for nesting because no nesting habitat is present. Bald eagles are not expected to forage on the site because of a lack of suitable prey items and golden eagles have a low potential to forage on the site given the small area of the project site and the limited amount of prey items.

### 5.2.3 California Wildlife Species of Special Concern

**Coastal whiptail (*Aspidoscelis tigris stejnegeri*).** Coastal whiptail are found in coastal southern California, mostly west of the Peninsular Ranges and south of the Transverse Ranges. There range extends north into Ventura County and south to Baja California. The coastal whiptail occurs in a variety of habitats including various upland and riparian habitats. It is most commonly associated with areas of dense vegetation but is also found around sandy areas along gravelly arroyos or washes (Stebbins 2003). Coastal whiptail were observed at three locations within the project site and are expected to occur throughout the project site. Two of the observations were within the proposed development area and the other was within the portions of 15$^{th}$ Street Basin that will remaining as open space (Figure 3, Attachment 1).

**Burrowing owl (*Athene cunicularia*).** Burrowing owl are uncommon throughout much of southern California with the highest densities occurring near agricultural lands in the Imperial Valley. Burrowing owl have been extirpated from portions of Orange County because of development. Burrowing owl are still periodically observed in the Inland Empire with the highest local concentrations near Ontario, approximately 5 miles southeast of the project site. Suitable burrowing owl burrows are present on the project site but limited. The habitat at the project site is marginally suitable for this species, but with a sufficient prey base, and an abundant ground squirrel population (for producing burrows), there is a moderate potential for breeding or wintering burrowing owls to be present on the site.

**Yellow-breasted chat (*Icteria virens*).** Yellow-breasted chat is a migratory species, occurring in California only during the breeding season which is typically between April and August. In California, it primarily breeds in the northern portion of the state and is scarce in the central and southern portions. It typically utilizes dense riparian thickets and brushy tangles near watercourses for breeding (CDFW 2022a). Yellow-breasted chat are known to nest at Cucamonga Basin, approximately 0.7 miles north of the project site. Marginally suitable riparian habitat for yellow-breasted chat is present and there us a moderate potential for yellow-breasted chat to be present on the project site.

**Yellow warbler (*Setophaga petechia*).** Yellow warbler is a migratory species, occurring in California only during the breeding season, which is typically between April and August. In California, it is widespread in riparian habitat throughout much of the state. It typically nests in dense riparian vegetation near watercourses (CDFW 2022a). Yellow warbler have not been previously detected on the project site but are known from several locations within 1 mile of the project site (eBird.org 2022). Suitable habitat is present throughout the project site, and there is a moderate potential for them to be present.

**San Diego desert woodrat (*Neotoma lepida intermedia*).** San Diego desert woodrat is known from coastal and desert scrub and rocky outcrops throughout much of southern California (CDFW 2022a). It frequently builds large middens (piles of sticks and debris arranged to form a shelter) in rock outcrops or around the bases of shrubs. In some portions of its range, it builds middens primarily at the bases of cactus (*Opuntia* sps.) and yucca (*Yucca* sps.) plants (Feldhamer et al. 2003). Habitat in the project site is suitable for San Diego desert woodrat and it has been documented within about 5 miles of the project site.

**Bats.** Several special-status bat species have at least a low potential to forage over the project site: pallid bat (*Antrozous pallidus*), Western mastiff bat (*Eumops perotis californicus*), hoary bat (*Lasiurus cinereus*), Western yellow bat (*Lasiurus xanthinus*), Yuma myotis (*Myotis yumanensis*), big free-tailed bat (*Nyctinomops macrotis*), and pocketed free-tailed bat (*Nyctinomops femorosaccus*). The pallid bat and Western mastiff bat forage in open areas over grasslands, agricultural areas, and other shrublands and roost in a variety of habitats including building, rock crevices, and caves. The pocketed free-tailed bat forages over water and open shrublands and roosts in crevices in cliffs. Hoary bats may roost in tree foliage within the project site. The remaining species are unlikely to roost in the project site because of a lack of suitable roosting habitat.

### 5.2.3 Other Special-Status Wildlife Species

**Crotch bumble bee (*Bombus crotchii*).** Crotch bumble bee was recently petitioned for listing under the CESA but was determined to not be eligible for protection under CESA. It is currently recognized as a special animal but may be petitioned again in the future based on a recent interpretation of CESA which indicates that some invertebrates may be eligible for protection. Crotch bumble bee is a widespread secretive species that is known from more than two hundred locations over a broad geographic range (CDFW 2022a). It is typically found in openings in grassland and scrub habitats where it burrows into the ground and lives in colonies. It feeds on native plants including milkweed, pincushion, lupine, phacelia, sage, snapdragon, clarkia, bush poppy, and buckwheat. Many of these food plants are present on the project site and suitable burrowing habitat is also present. Crotch bumblebee has a moderate potential to be present on the site and is known from numerous observations in the region.

**Raptors:** Two additional special-status bird of prey are found throughout the region. Cooper's hawk (*Accipiter cooperii*; CDFW Watch List species) and white-tailed kite (*Elanus leucurus*); CDFW Watch List species) are known to nest in and around urban areas of Southern California and forages in open space. Suitable nesting habitat for these species is limited and foraging habitat for these species is present within the project site. A single Cooper’s hawk was observed flying over the project site during the biological survey.

**Other special-status birds**: Two additional special-status bird species are reported from the surrounding area (CDFW, 2022a; Table 2): Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*; CDFW Watch List Species) and California horned lark (*Eremophila alpestris actia*). These species were not observed on the project site during field surveys. These species are known from throughout the region and are likely to forage on the project site but are not expected to nest on the project site. Several birds identified as Birds of Conservation Concern were also identified in the USFWS IPaC search (Attachment 3). Several of these including Allen’s hummingbird (*Selasphorus sasin*), Bullock’s oriole (*Icterus bullockii*), California thrasher (*Toxostoma redivivum*), common yellowthroat (*Geothlypis trichas sinuosa*), Lawrence’s goldfinch (*Carduelis lawrencei*), Nuttall's woodpecker (*Picoides nuttallii*), and oak titmouse (*Baeolophus inornatus*). These species have a potential to be present on the project site but do not have any formal protection.

## 5.3 Designated Critical Habitat

The literature review conducted prior to conducting field surveys determined that the project site is not within federally designated critical habitat for any species. The nearest designated critical habitat is for San Bernardino kangaroo rat and is located approximately 4 miles northeast of the project site (USFWS 2002).

## 5.4 Native Birds: Migratory Bird Treaty Act (MBTA) / California Fish and Game Code

The federal MBTA prohibits take of any migratory bird, including eggs or active nests, except as permitted by regulation (e.g., licensed hunting of waterfowl or upland game species). Under the MBTA, "migratory bird" is broadly defined as "any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle" and thus applies to most native bird species. California Fish and Game Code Section 3503 prohibits take, possession, or needless destruction of bird nests or eggs; Section 3503.5 prohibits take or possession of birds of prey or their eggs; and Section 3513 prohibits take or possession of any migratory nongame bird. With the exception of a few non-native birds, such as European starling, the take of any birds or loss of active bird nests or young is regulated by these statutes. Most of these species have no other special conservation status as defined above.

The project site has many trees, shrubs, and open areas that may provide nesting habitat. Numerous common and special-status birds are known to nest in the area and many of these are likely to nest on the project site. No active nests were observed during the biological surveys.

Many adult birds would flee from equipment during project construction; however, nestlings and eggs would be vulnerable. If project activities include site grading or brush removal during nesting season, then it would likely destroy bird nests, including eggs or nestling birds. For most birds, these impacts can be avoided by scheduling initial clearing and grading outside the nesting season. Or, if initial clearing and grading are undertaken during nesting season, work may be limited only to areas where no nesting birds are present, as documented by pre-construction nest surveys.

Some birds are likely to nest in the project site during construction, even after initial grading and clearing have been completed. Depending on the species, birds may nest on the ground; in adjacent vegetation; or on construction equipment that is left overnight or during a long weekend. The species most likely to nest in the project site during construction are common ravens, house finches, killdeer, and mourning doves, all of which are protected by the MBTA and Fish and Game Code. Due to the high probability that birds may nest on site during construction, regular monitoring and nest site management may be necessary throughout the breeding season.

## 5.5 Wildlife Movement

The ability for wildlife to move freely among populations and habitat areas is important to long-term genetic variation and demography. Fragmentation and isolation of natural habitat may cause loss of native species diversity in fragmented habitats. In the short term, wildlife movement may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations are especially important for rare, threatened, or endangered species, and wide-ranging species such as large mammals, which exist in low population densities.

The California Essential Habitat Connectivity Project was commissioned by the California Department of Transportation (Caltrans) and CDFW to create a statewide assessment of essential habitat connectivity to

be used for conservation and infrastructure planning (Caltrans and CDFW 2010). One of its goals was to create the Essential Connectivity Map, which depicts large, relatively natural habitat blocks that support native biodiversity (natural landscape blocks) and areas essential for ecological connectivity between them (essential connectivity areas). This map does not reflect the needs of particular species but is based on overall biological connectivity and ecological integrity. A more detailed analysis is required to assess local and regional needs for connectivity and develop linkage designs based on the requirements of individual species (Caltrans and CDFW 2010). The project site is not located within any identified Essential Habitat Connectivity Areas or Natural Landscape Blocks. The project site is more likely to support more localized movement within the region, with some species such as coyote occupying the project site and radiating out into the adjacent development to forage.

# 6.0 Impact Assessment

Several special-status biological resources that were observed on the project site or have at least a moderate potential to be present and may be impacted as discussed below. This analysis in intended to lay the framework for analysis under the CEQA.

## 6.1 Vegetation and Cover Types

Five vegetation types and one additional cover type are present within the project site. One of these vegetation types, scale broom scrub, is present and is a sensitive natural community. Scale broom scrub is discussed below in Section 6.2. The remaining four vegetation types and one cover type are not protected communities and are also not limited in the region. For these reasons, impacts to the remaining vegetation and land cover types are not expected to be significant under CEQA.

## 6.2 Sensitive Natural Communities

One sensitive natural community, scale broom scrub, was observed within the project site. A total of 0.14 acres of scale broom scrub are within the Development Area and will be removed. The scale broom scrub within the project site is limited to the north-facing basin slope and is providing limited habitat value. The loss of 0.14 acres of scale broom scrub is a limited impact but may be significant under CEQA. A mitigation measure has been added below to offset the loss of scale broom scrub.

## 6.3 Wildlife Habitat

The project would result in the loss of 9.13 acres of wildlife habitat within the Development Area. The loss of this habitat for common species is not expected to be significant under CEQA and no mitigation for the loss of wildlife habitat is expected. Loss of special-status species habitat is discussed below.

## 6.4 Special-Status Plants

No special-status plants were observed on the project site. Parry's spineflower has a CRPR of 1B.1 and a low to moderate potential to be present. It was not detected in 2022 and therefore impacts to this species are expected to be less than significant. Two special-status plants with a CRPR of 4 have a moderate potential to be present but were not observed. Plants ranked as CRPR 4 have no formal protection under CEQA and impacts to these species would be less than significant. No mitigation measures are required for potential impacts to special-status plants.

## 6.5 Special-Status Wildlife

Two special-status wildlife species were observed on the project site during the surveys. These include coastal whiptail and Cooper's hawk. Coastal whiptail is a CDFW Species of Special Concern and impacts may be significant under CEQA. A mitigation measure has been added below to reduce any potential impacts to this species. Cooper's hawk is a CDFW watch list species which has no formal protection and requires to impact assessment under CEQA. If nesting on site, Cooper's hawks may be impacted. Mitigation measures below to protect nesting birds would also protect Cooper's hawk and would reduce any potential impacts. No additional mitigation measures are needed to avoid or reduce potential impacts to special-status wildlife.

## 6.6 Native Birds: Migratory Bird Treaty Act (MBTA) / California Fish and Game Code

Nesting birds on the project site have a potential to be impacted by project construction. Impacts to nesting birds would violate the MBTA and Fish and Game Code. It could also result in significant impacts under CEQA. To mitigate any potential impacts to nesting birds, a mitigation measure has been added below.

## 6.7 Wildlife Movement

Project construction is not expected to result in significant impacts to wildlife movement or corridors. As discussed above, the project site is likely to support localized movement within the basin and is not expected to provide a wildlife corridor. Wildlife utilizing the Development Area would be pushed further east into the Conservation Area, golf courses, and open space. Impacts to wildlife movement would be less than significant.

# 7.0 Mitigation Measures

To avoid or reduce potential impacts to special-status biological resources on the project site, Aspen recommends the following mitigation measures. These measures are intended to avoid or reduce impacts to sensitive natural communities, special-status wildlife, and nesting birds within the Development Area. The biological resource measures area as follows:

- To mitigate the anticipated loss of 0.14 acres of scale broom scrub, the City of Upland will incorporate scale broom scrub habitat creation into the Habitat Mitigation and Monitoring Plan for the Conservation Area. It is expected that 0.14 acres of scale broom scrub will be created to offset the loss of this sensitive natural community. The methods to be used for habitat creation, success criteria, and monitoring schedule will all be specified in the Habitat Mitigation and Monitoring Plan.
- To mitigate potential impacts to coastal whiptail on the project site, the City of Upland will assign a Qualified Biologist to the project to be present during initial vegetation clearing and soil disturbance. The Qualified Biologist will capture coastal whiptail and any other special-status species from with the Development Area and will relocate them into the Conservation Area.
- To mitigate potential impacts to nesting birds, initial vegetation clearing, and soil disturbance will be scheduled between August 16th and February 14th, outside of the nesting bird season. If avoidance of the nesting season is not feasible and must initiate between February 15th and August 15th, a Qualified Biologist will conduct pre-construction nesting bird surveys. If nests are found, appropriate buffers will

be established around the nests to ensure that the nests are not impacted. Once the nests are inactive, the Qualified Biologist will remove the buffer and work will be allowed to proceed.

- To mitigate potential impacts to burrowing owl, a Qualified Biologist will complete a pre-construction survey for burrowing owl. If burrowing owl are found on the project site outside of the nesting season (September 1st through January 31st), the burrowing owls will be relocated according to the methods specified in the 2012 Staff Report on Burrowing Owl Mitigation (CDFW, 2012). If burrowing owls are found on the project site during the nesting season (February 1st through August 31st), they will be avoided throughout the duration of the nesting season. Buffers will be established based on the 2012 Staff Report on Burrowing Owl Mitigation (CDFW, 2012).

# 8.0 Conclusions

No State and federally listed species are known from the project site or the immediate vicinity. Two special-status wildlife species were observed, including coastal whiptail and Cooper's hawk. Impacts to both of these species are expected to be less than significant with the incorporated mitigation measures. Several other special-status wildlife species have a potential to be present but mitigation measures for the species mentioned above would also minimize or avoid impacts to these additional species. One sensitive natural community, scale broom scrub, was also observed within the project site. Mitigation measures included would offset the loss of this natural community and would result in a less than significant impact. With implementation of the mitigation measures in this report, all impacts to protected biological resources would be avoided, minimized, or otherwise mitigated for.

# 9.0 Literature Cited

American Ornithologists' Union. 1998. Checklist of the North American Birds, 7th ed. Prepared by Committee on Classification and Nomenclature. American Ornithologists' Union, Washington DC.

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, D.H. Wilken (eds.) 2012. The Jepson Manual: Vascular Plants of California, 2nd ed. University Press, Berkeley, California.

Barbour, R.W. and W.H. Davis. 1969. Bats of America. University Press of Kentucky, Lexington, Kentucky. CBOC (California Burrowing Owl Consortium). 1993. Burrowing owl survey protocol and mitigation guidelines. Alviso, California. 13 pp.

CDFW (California Department of Fish and Wildlife). 2022a. California Natural Diversity Database (CNDDB), Rarefind, Version 5. Heritage section, CDFW, Sacramento.

_____. 2022b. Special Vascular Plants, Bryophytes, and Lichens List. CDFW, Sacramento. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline

_____. 2022c. California Natural Community List. CDFW. Sacramento. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline

_____. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959

_____. 2012. Staff Report on Burrowing Owl Mitigation. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843&inline=true

CalTrans and CDFW (California Department of Transportation and California Department of Fish and Wildlife). 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Online: http://www.dfg.ca.gov/habcon/connectivity/

CNPS (California Native Plant Society). 2022. Inventory of rare and endangered plants. California Native Plant Society. Sacramento. Online: http://www.cnps.org/inventory. Accessed August 2022.

CCH (Consortium of California Herbaria). 2022. Botanical specimen data provided by the participants of the Consortium of California Herbaria. Online: http://ucjeps.berkeley.edu/consortium/ Accessed August 2022.

eBird.org. 2022. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org Accessed August 2022.

Feldhamer, G.A., B.C. Thompson, and J.A. Chapman (eds.). 2003. Wild Mammals of North America: Biology, Management and Conservation, 2nd ed. Johns Hopkins University Press, Baltimore MD.

Garrett, K. and J. Dunn. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Society, Los Angeles, California.

Hall, E.R. 1981. The Mammals of North America. John Wiley and Sons, New York.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Dept. of Fish and Game, Sacramento.

Los Angeles County (Los Angeles County Public Works). 2022. Near Real-Time Precipitation Map. https://dpw.lacounty.gov/wrd/rainfall/ Accessed September 2022.

RCA Associates, Inc. 2022. General Biological Resources Assessment, Upland, San Bernardino County , California, APN: 3105-171-08.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. Manual of California Vegetation, 2nd ed. California Native Plant Society, Sacramento, California. 1300 pp.

Stebbins, R.C. 2003. Western Reptiles and Amphibians, 3rd ed. Houghton Mifflin Company, Boston Mass.

USFWS (U.S. Fish and Wildlife Service). 2022. IPaC Information for Planning and Consultation. [Online]: https://ipac.ecosphere.fws.gov/ Accessed August 2022.

_____. 2007a. Protection of Eagles; Definition of ‘‘Disturb.’’ Federal Register 72:31132 -31140 (5 Jun).

_____. 2007b. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*). Federal Register 72:72010-72213 (19 Dec).

_____. 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*). Federal Register 67:19812-19845 (23 Apr).

Wilson, D.E. and S. Ruff (eds.). 1999. Smithsonian Book of North American Mammals. Smithsonian Institution Press, Washington DC.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White (eds.). 1990. California's Wildlife. Vol. III. Mammals. California Department of Fish and Wildlife, Sacramento.

# Attachment 1 – Figures




**Figure 1**

**Project Overview**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

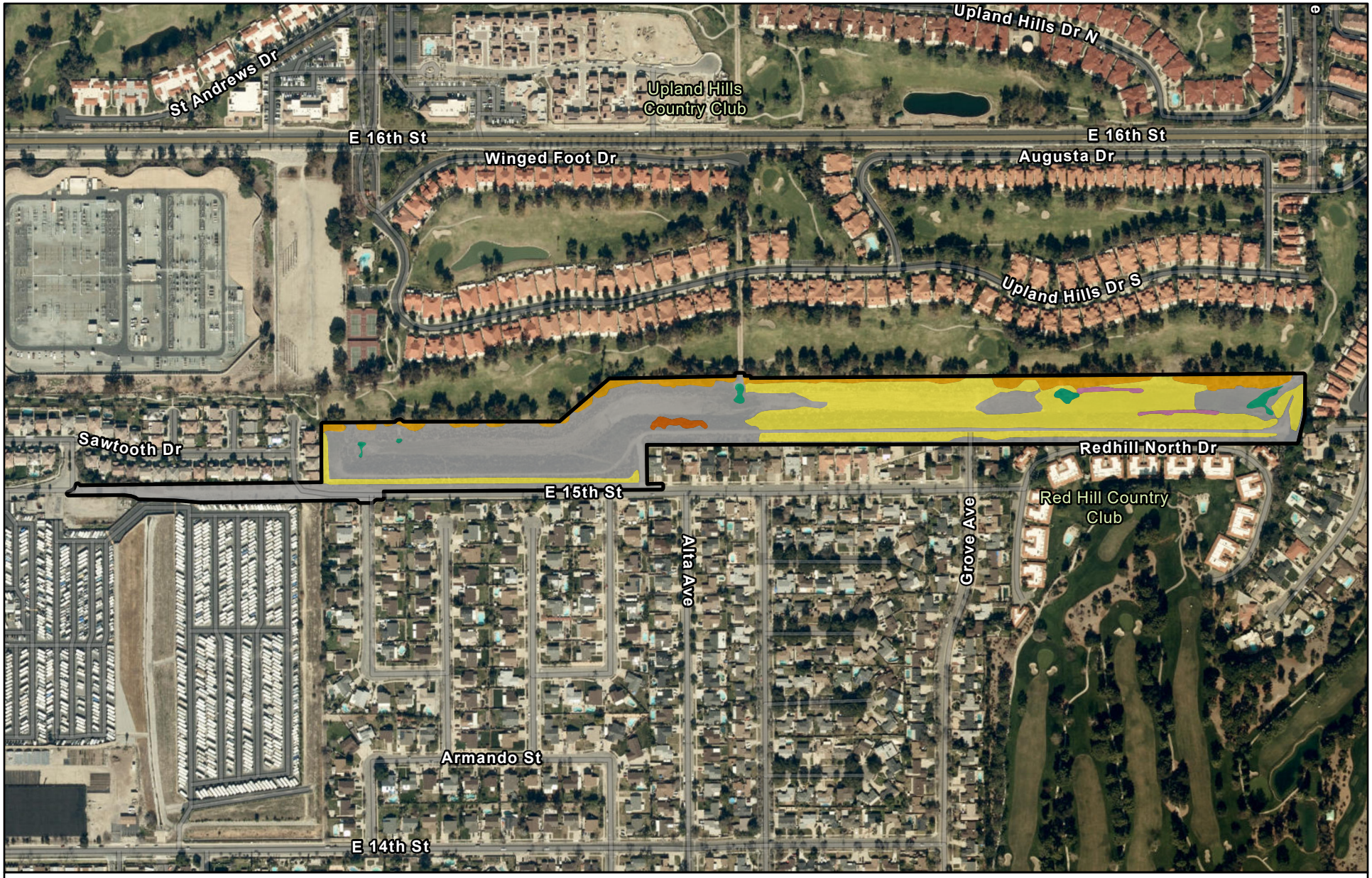


**Figure 2**

**Vegetation and Land Cover**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

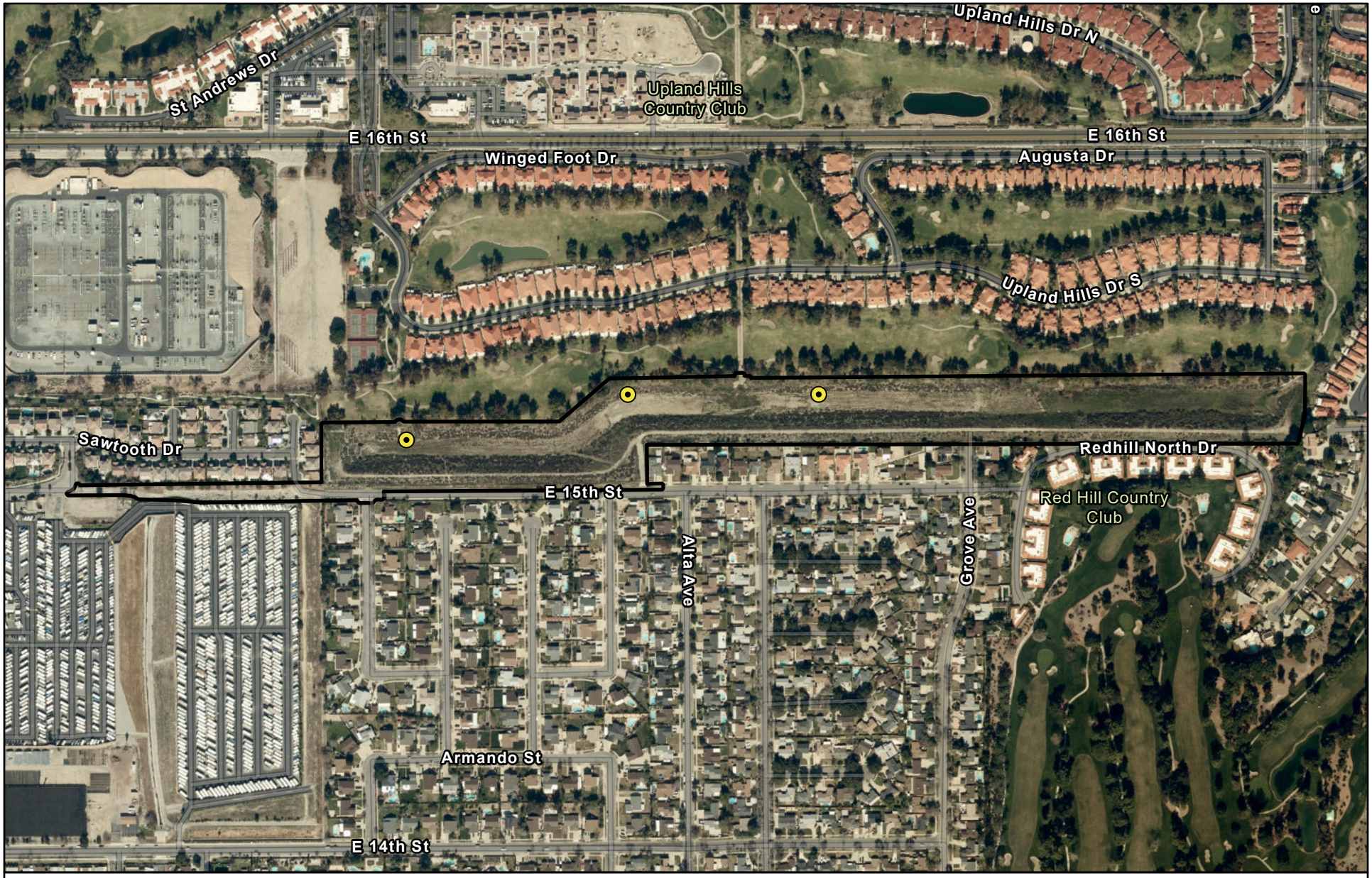


**Figure 3**

**Biological Resources**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

## Attachment 2 – CNDDB Query Results

# Selected Elements by Scientific Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad IS (Mt. Baldy (3411726) OR Ontario (3411716) OR Glendora (3411727) OR San Dimas (3411717) OR Guasti (3411715) OR Cucamonga Peak (3411725) OR Yorba Linda (3311787) OR Prado Dam (3311786) OR Corona North (3311785))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Abronia villosa var. aurita*** chaparral sand-verbena | PDNYC010P1 | None | None | G5T2? | S2 | 1B.1 |
| ***Accipiter cooperii*** Cooper's hawk | ABNKC12040 | None | None | G5 | S4 | WL |
| ***Agelaius tricolor*** tricolored blackbird | ABPBXB0020 | None | Threatened | G1G2 | S1S2 | SSC |
| ***Aimophila ruficeps canescens*** southern California rufous-crowned sparrow | ABPBX91091 | None | None | G5T3 | S3 | WL |
| ***Ammodramus savannarum*** grasshopper sparrow | ABPBXA0020 | None | None | G5 | S3 | SSC |
| ***Anaxyrus californicus*** arroyo toad | AAABB01230 | Endangered | None | G2G3 | S2S3 | SSC |
| ***Anniella stebbinsi*** Southern California legless lizard | ARACC01060 | None | None | G3 | S3 | SSC |
| ***Antrozous pallidus*** pallid bat | AMACC10010 | None | None | G4 | S3 | SSC |
| ***Aquila chrysaetos*** golden eagle | ABNKC22010 | None | None | G5 | S3 | FP |
| ***Arctostaphylos glandulosa ssp. gabrielensis*** San Gabriel manzanita | PDERI042P0 | None | None | G5T3 | S3 | 1B.2 |
| ***Arizona elegans occidentalis*** California glossy snake | ARADB01017 | None | None | G5T2 | S2 | SSC |
| ***Artemisiospiza belli belli*** Bell's sage sparrow | ABPBX97021 | None | None | G5T2T3 | S3 | WL |
| ***Asio otus*** long-eared owl | ABNSB13010 | None | None | G5 | S3? | SSC |
| ***Aspidoscelis hyperythra*** orange-throated whiptail | ARACJ02060 | None | None | G5 | S2S3 | WL |
| ***Aspidoscelis tigris stejnegeri*** coastal whiptail | ARACJ02143 | None | None | G5T5 | S3 | SSC |
| ***Astragalus brauntonii*** Braunton's milk-vetch | PDFAB0F1G0 | Endangered | None | G2 | S2 | 1B.1 |
| ***Athene cunicularia*** burrowing owl | ABNSB10010 | None | None | G4 | S3 | SSC |
| ***Atractelmis wawona*** Wawona riffle beetle | IICOL58010 | None | None | G3 | S1S2 | |
| ***Atriplex coulteri*** Coulter's saltbush | PDCHE040E0 | None | None | G3 | S1S2 | 1B.2 |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Batrachoseps gabrieli*** San Gabriel slender salamander | AAAAD02110 | None | None | G2G3 | S2S3 | |
| ***Berberis nevinii*** Nevin's barberry | PDBER060A0 | Endangered | Endangered | G1 | S1 | 1B.1 |
| ***Bombus crotchii*** Crotch bumble bee | IIHYM24480 | None | None | G2 | S1S2 | |
| ***Brodiaea filifolia*** thread-leaved brodiaea | PMLIL0C050 | Threatened | Endangered | G2 | S2 | 1B.1 |
| ***Buteo swainsoni*** Swainson's hawk | ABNKC19070 | None | Threatened | G5 | S3 | |
| ***California Walnut Woodland*** California Walnut Woodland | CTT71210CA | None | None | G2 | S2.1 | |
| ***Callophrys mossii hidakupa*** San Gabriel Mountains elfin butterfly | IILEPE2206 | None | None | G4T1T2 | S1S2 | |
| ***Calochortus clavatus var. gracilis*** slender mariposa-lily | PMLIL0D096 | None | None | G4T2T3 | S2S3 | 1B.2 |
| ***Calochortus plummerae*** Plummer's mariposa-lily | PMLIL0D150 | None | None | G4 | S4 | 4.2 |
| ***Calochortus weedii var. intermedius*** intermediate mariposa-lily | PMLIL0D1J1 | None | None | G3G4T3 | S3 | 1B.2 |
| ***Calystegia felix*** lucky morning-glory | PDCON040P0 | None | None | G1Q | S1 | 1B.1 |
| ***Campylorhynchus brunneicapillus sandiegensis*** coastal cactus wren | ABPBG02095 | None | None | G5T3Q | S3 | SSC |
| ***Canyon Live Oak Ravine Forest*** Canyon Live Oak Ravine Forest | CTT61350CA | None | None | G3 | S3.3 | |
| ***Castilleja gleasoni*** Mt. Gleason paintbrush | PDSCR0D140 | None | Rare | G2 | S2 | 1B.2 |
| ***Catostomus santaanae*** Santa Ana sucker | AFCJC02190 | Threatened | None | G1 | S1 | |
| ***Centromadia pungens ssp. laevis*** smooth tarplant | PDAST4R0R4 | None | None | G3G4T2 | S2 | 1B.1 |
| ***Chaetodipus fallax fallax*** northwestern San Diego pocket mouse | AMAFD05031 | None | None | G5T3T4 | S3S4 | SSC |
| ***Chorizanthe parryi var. parryi*** Parry's spineflower | PDPGN040J2 | None | None | G3T2 | S2 | 1B.1 |
| ***Cladium californicum*** California saw-grass | PMCYP04010 | None | None | G4 | S2 | 2B.2 |
| ***Claytonia peirsonii ssp. peirsonii*** Peirson's spring beauty | PDPOR03121 | None | None | G2G3T2 | S2 | 1B.2 |
| ***Coastal and Valley Freshwater Marsh*** Coastal and Valley Freshwater Marsh | CTT52410CA | None | None | G3 | S2.1 | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Coccyzus americanus occidentalis*** western yellow-billed cuckoo | ABNRB02022 | Threatened | Endangered | G5T2T3 | S1 | |
| ***Coleonyx variegatus abbotti*** San Diego banded gecko | ARACD01031 | None | None | G5T5 | S1S2 | SSC |
| ***Coturnicops noveboracensis*** yellow rail | ABNME01010 | None | None | G4 | S1S2 | SSC |
| ***Crotalus ruber*** red-diamond rattlesnake | ARADE02090 | None | None | G4 | S3 | SSC |
| ***Cypseloides niger*** black swift | ABNUA01010 | None | None | G4 | S2 | SSC |
| ***Diplectrona californica*** California diplectronan caddisfly | IITRI23010 | None | None | G1G2 | S1S2 | |
| ***Dipodomys merriami parvus*** San Bernardino kangaroo rat | AMAFD03143 | Endangered | Candidate Endangered | G5T1 | S1 | SSC |
| ***Dipodomys stephensi*** Stephens' kangaroo rat | AMAFD03100 | Threatened | Threatened | G2 | S2 | |
| ***Dodecahema leptoceras*** slender-horned spineflower | PDPGN0V010 | Endangered | Endangered | G1 | S1 | 1B.1 |
| ***Dudleya densiflora*** San Gabriel Mountains dudleya | PDCRA040B0 | None | None | G2 | S2 | 1B.1 |
| ***Dudleya multicaulis*** many-stemmed dudleya | PDCRA040H0 | None | None | G2 | S2 | 1B.2 |
| ***Elanus leucurus*** white-tailed kite | ABNKC06010 | None | None | G5 | S3S4 | FP |
| ***Empidonax traillii extimus*** southwestern willow flycatcher | ABPAE33043 | Endangered | Endangered | G5T2 | S1 | |
| ***Emys marmorata*** western pond turtle | ARAAD02030 | None | None | G3G4 | S3 | SSC |
| ***Ensatina eschscholtzii klauberi*** large-blotched salamander | AAAAD04013 | None | None | G5T2? | S3 | WL |
| ***Eremophila alpestris actia*** California horned lark | ABPAT02011 | None | None | G5T4Q | S4 | WL |
| ***Eriastrum densifolium ssp. sanctorum*** Santa Ana River woollystar | PDPLM03035 | Endangered | Endangered | G4T1 | S1 | 1B.1 |
| ***Eriogonum microthecum var. johnstonii*** Johnston's buckwheat | PDPGN083W5 | None | None | G5T2 | S2 | 1B.3 |
| ***Eumops perotis californicus*** western mastiff bat | AMACD02011 | None | None | G4G5T4 | S3S4 | SSC |
| ***Falco columbarius*** merlin | ABNKD06030 | None | None | G5 | S3S4 | WL |
| ***Fimbristylis thermalis*** hot springs fimbristylis | PMCYP0B0N0 | None | None | G4 | S1S2 | 2B.2 |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Gila orcuttii*** arroyo chub | AFCJB13120 | None | None | G2 | S2 | SSC |
| ***Glyptostoma gabrielense*** San Gabriel chestnut | IMGASB1010 | None | None | G2 | S2 | |
| ***Gonidea angulata*** western ridged mussel | IMBIV19010 | None | None | G3 | S1S2 | |
| ***Horkelia cuneata var. puberula*** mesa horkelia | PDROS0W045 | None | None | G4T1 | S1 | 1B.1 |
| ***Icteria virens*** yellow-breasted chat | ABPBX24010 | None | None | G5 | S3 | SSC |
| ***Imperata brevifolia*** California satintail | PMPOA3D020 | None | None | G3 | S3 | 2B.1 |
| ***Lasiurus cinereus*** hoary bat | AMACC05030 | None | None | G3G4 | S4 | |
| ***Lasiurus xanthinus*** western yellow bat | AMACC05070 | None | None | G4G5 | S3 | SSC |
| ***Laterallus jamaicensis coturniculus*** California black rail | ABNME03041 | None | Threatened | G3T1 | S1 | FP |
| ***Lepidium virginicum var. robinsonii*** Robinson's pepper-grass | PDBRA1M114 | None | None | G5T3 | S3 | 4.3 |
| ***Lepus californicus bennettii*** San Diego black-tailed jackrabbit | AMAEB03051 | None | None | G5T3T4 | S3S4 | |
| ***Lilium parryi*** lemon lily | PMLIL1A0J0 | None | None | G3 | S3 | 1B.2 |
| ***Linanthus concinnus*** San Gabriel linanthus | PDPLM090D0 | None | None | G2 | S2 | 1B.2 |
| ***Monardella australis ssp. jokerstii*** Jokerst's monardella | PDLAM18112 | None | None | G4T1? | S1? | 1B.1 |
| ***Monardella breweri ssp. glandulifera*** Brown's Flat monardella | PDLAM180B1 | None | None | G5T1 | S1 | 1B.2 |
| ***Monardella macrantha ssp. hallii*** Hall's monardella | PDLAM180E1 | None | None | G5T3 | S3 | 1B.3 |
| ***Muhlenbergia californica*** California muhly | PMPOA480A0 | None | None | G4 | S4 | 4.3 |
| ***Muhlenbergia utilis*** aparejo grass | PMPOA481X0 | None | None | G4 | S2S3 | 2B.2 |
| ***Myotis yumanensis*** Yuma myotis | AMACC01020 | None | None | G5 | S4 | |
| ***Navarretia prostrata*** prostrate vernal pool navarretia | PDPLM0C0Q0 | None | None | G2 | S2 | 1B.2 |
| ***Neolarra alba*** white cuckoo bee | IIHYM81010 | None | None | GH | SH | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Neotoma lepida intermedia*** San Diego desert woodrat | AMAFF08041 | None | None | G5T3T4 | S3S4 | SSC |
| ***Nyctinomops femorosaccus*** pocketed free-tailed bat | AMACD04010 | None | None | G5 | S3 | SSC |
| ***Nyctinomops macrotis*** big free-tailed bat | AMACD04020 | None | None | G5 | S3 | SSC |
| ***Oncorhynchus mykiss irideus pop. 10*** steelhead - southern California DPS | AFCHA0209J | Endangered | Candidate Endangered | G5T1Q | S1 | |
| ***Oreonana vestita*** woolly mountain-parsley | PDAPI1G030 | None | None | G3 | S3 | 1B.3 |
| ***Orobanche valida ssp. valida*** Rock Creek broomrape | PDORO040G2 | None | None | G4T2 | S2 | 1B.2 |
| ***Ovis canadensis nelsoni*** desert bighorn sheep | AMALE04013 | None | None | G4T4 | S3 | FP |
| ***Perognathus longimembris brevinasus*** Los Angeles pocket mouse | AMAFD01041 | None | None | G5T2 | S1S2 | SSC |
| ***Phacelia stellaris*** Brand's star phacelia | PDHYD0C510 | None | None | G1 | S1 | 1B.1 |
| ***Phrynosoma blainvillii*** coast horned lizard | ARACF12100 | None | None | G3G4 | S3S4 | SSC |
| ***Polioptila californica californica*** coastal California gnatcatcher | ABPBJ08081 | Threatened | None | G4G5T3Q | S2 | SSC |
| ***Pseudognaphalium leucocephalum*** white rabbit-tobacco | PDAST440C0 | None | None | G4 | S2 | 2B.2 |
| ***Rana boylii*** foothill yellow-legged frog | AAABH01050 | None | Endangered | G3 | S3 | SSC |
| ***Rana muscosa*** southern mountain yellow-legged frog | AAABH01330 | Endangered | Endangered | G1 | S1 | WL |
| ***Rhaphiomidas terminatus abdominalis*** Delhi Sands flower-loving fly | IIDIP05021 | Endangered | None | G1T1 | S1 | |
| ***Rhinichthys osculus ssp. 8*** Santa Ana speckled dace | AFCJB3705K | None | None | G5T1 | S1 | SSC |
| ***Riversidian Alluvial Fan Sage Scrub*** Riversidian Alluvial Fan Sage Scrub | CTT32720CA | None | None | G1 | S1.1 | |
| ***Sagittaria sanfordii*** Sanford's arrowhead | PMALI040Q0 | None | None | G3 | S3 | 1B.2 |
| ***Salvadora hexalepis virgultea*** coast patch-nosed snake | ARADB30033 | None | None | G5T4 | S2S3 | SSC |
| ***Senecio aphanactis*** chaparral ragwort | PDAST8H060 | None | None | G3 | S2 | 2B.2 |
| ***Setophaga petechia*** yellow warbler | ABPBX03010 | None | None | G5 | S3S4 | SSC |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Sidalcea neomexicana*** salt spring checkerbloom | PDMAL110J0 | None | None | G4 | S2 | 2B.2 |
| ***Southern California Arroyo Chub/Santa Ana Sucker Stream*** Southern California Arroyo Chub/Santa Ana Sucker Stream | CARE2330CA | None | None | GNR | SNR | |
| ***Southern Coast Live Oak Riparian Forest*** Southern Coast Live Oak Riparian Forest | CTT61310CA | None | None | G4 | S4 | |
| ***Southern Cottonwood Willow Riparian Forest*** Southern Cottonwood Willow Riparian Forest | CTT61330CA | None | None | G3 | S3.2 | |
| ***Southern Sycamore Alder Riparian Woodland*** Southern Sycamore Alder Riparian Woodland | CTT62400CA | None | None | G4 | S4 | |
| ***Southern Willow Scrub*** Southern Willow Scrub | CTT63320CA | None | None | G3 | S2.1 | |
| ***Spea hammondii*** western spadefoot | AAABF02020 | None | None | G2G3 | S3 | SSC |
| ***Streptanthus bernardinus*** Laguna Mountains jewelflower | PDBRA2G060 | None | None | G3G4 | S3S4 | 4.3 |
| ***Symphyotrichum defoliatum*** San Bernardino aster | PDASTE80C0 | None | None | G2 | S2 | 1B.2 |
| ***Symphyotrichum greatae*** Greata's aster | PDASTE80U0 | None | None | G2 | S2 | 1B.3 |
| ***Taricha torosa*** Coast Range newt | AAAAF02032 | None | None | G4 | S4 | SSC |
| ***Taxidea taxus*** American badger | AMAJF04010 | None | None | G5 | S3 | SSC |
| ***Thamnophis hammondii*** two-striped gartersnake | ARADB36160 | None | None | G4 | S3S4 | SSC |
| ***Thelypteris puberula var. sonorensis*** Sonoran maiden fern | PPTHE05192 | None | None | G5T3 | S2 | 2B.2 |
| ***Thysanocarpus rigidus*** rigid fringepod | PDBRA2Q070 | None | None | G1G2 | S2 | 1B.2 |
| ***Viola pinetorum ssp. grisea*** grey-leaved violet | PDVIO04431 | None | None | G4G5T3 | S3 | 1B.2 |
| ***Vireo bellii pusillus*** least Bell's vireo | ABPBW01114 | Endangered | Endangered | G5T2 | S2 | |
| ***Walnut Forest*** Walnut Forest | CTT81600CA | None | None | G1 | S1.1 | |

**Record Count: 121**

## Attachment 3 – IPaC Resource List

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

## Location

San Bernardino County, California




## Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440
(760) 431-5901

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

NOT FOR CONSULTATION

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

# Mammals

| NAME | STATUS |
|---|---|
| San Bernardino Merriam's Kangaroo Rat Dipodomys merriami parvus<br>Wherever found<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>https://ecos.fws.gov/ecp/species/2060 | Endangered |

# Birds

| NAME | STATUS |
|---|---|
| Coastal California Gnatcatcher Polioptila californica californica<br>Wherever found<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>https://ecos.fws.gov/ecp/species/8178 | Threatened |
| Least Bell's Vireo Vireo bellii pusillus<br>Wherever found<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>https://ecos.fws.gov/ecp/species/5945 | Endangered |

# Insects

| NAME | STATUS |
|---|---|
| Monarch Butterfly Danaus plexippus<br>Wherever found<br>No critical habitat has been designated for this species.<br>https://ecos.fws.gov/ecp/species/9743 | Candidate |

# Flowering Plants

| NAME | STATUS |
|---|---|

NOT FOR CONSULTATION

San Diego Ambrosia Ambrosia pumila — Endangered

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/8287

# Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

**The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location.** To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around

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your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

| NAME | BREEDING SEASON |
|---|---|
| Allen's Hummingbird Selasphorus sasin<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9637 | Breeds Feb 1 to Jul 15 |
| Bald Eagle Haliaeetus leucocephalus<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. | Breeds Jan 1 to Aug 31 |
| Belding's Savannah Sparrow Passerculus sandwichensis beldingi<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/8 | Breeds Apr 1 to Aug 15 |
| Black-chinned Sparrow Spizella atrogularis<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9447 | Breeds Apr 15 to Jul 31 |
| Bullock's Oriole Icterus bullockii<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA | Breeds Mar 21 to Jul 25 |
| California Thrasher Toxostoma redivivum<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Jan 1 to Jul 31 |

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| | |
|---|---|
| Common Yellowthroat Geothlypis trichas sinuosa<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/2084 | Breeds May 20 to Jul 31 |
| Lawrence's Goldfinch Carduelis lawrencei<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9464 | Breeds Mar 20 to Sep 20 |
| Nuttall's Woodpecker Picoides nuttallii<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/9410 | Breeds Apr 1 to Jul 20 |
| Oak Titmouse Baeolophus inornatus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9656 | Breeds Mar 15 to Jul 15 |
| Olive-sided Flycatcher Contopus cooperi<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/3914 | Breeds May 20 to Aug 31 |
| Western Grebe aechmophorus occidentalis<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/6743 | Breeds Jun 1 to Aug 31 |
| Wrentit Chamaea fasciata<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Mar 15 to Aug 10 |

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# Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

**Probability of Presence** (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

**Breeding Season** (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

**No Data** (–)
A week is marked as having no data if there were no survey events for that week.

**Survey Timeframe**
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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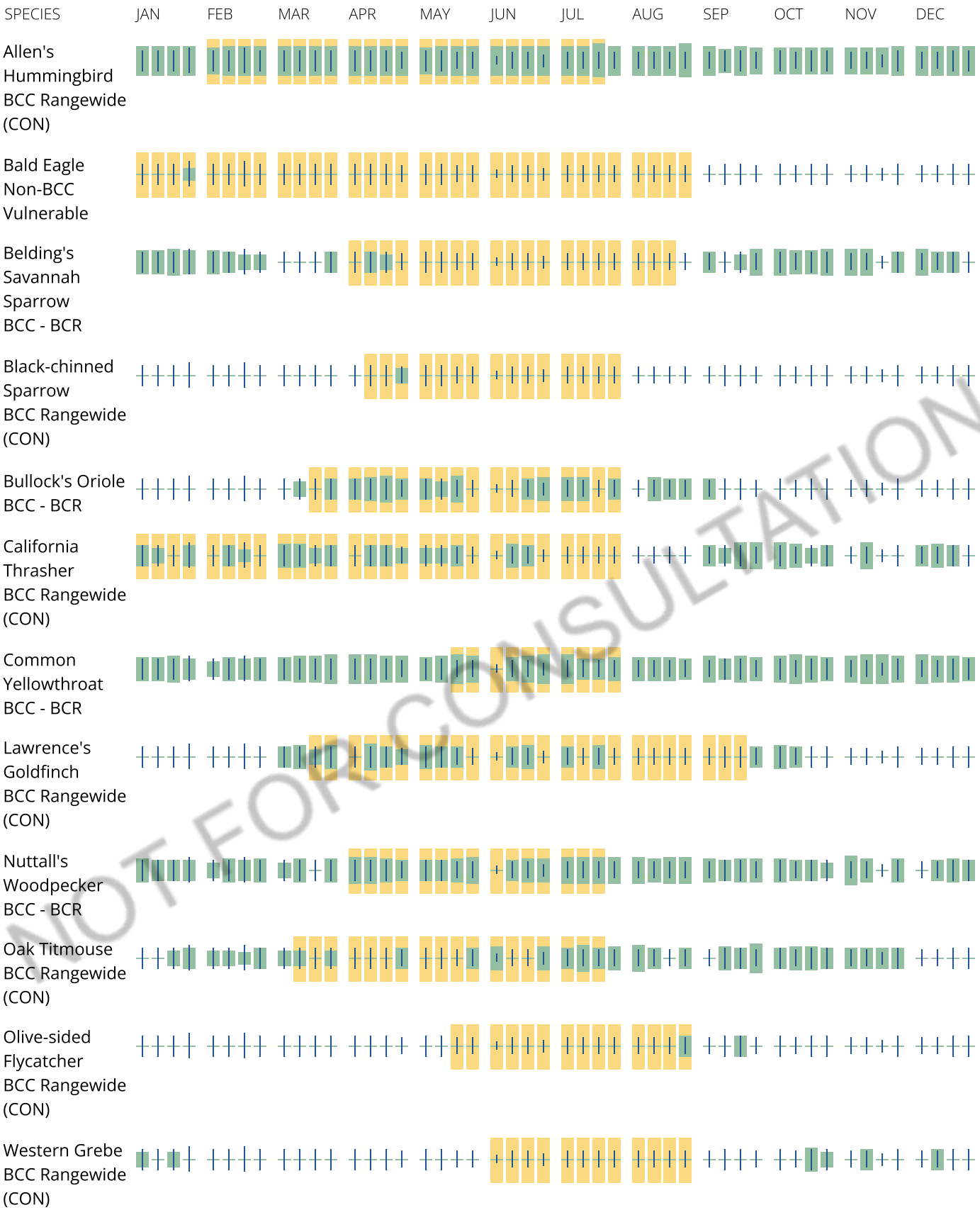


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**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering or migrating in my area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

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1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn

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more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

# Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

## There are no known coastal barriers at this location.

**Data limitations**

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

**Data exclusions**

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

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# Facilities

# National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

## Fish hatcheries

There are no fish hatcheries at this location.

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

Palustrine

A full description for each wetland code can be found at the National Wetlands Inventory website

**NOTE:** This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

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**Data limitations**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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# Attachment 4 – Special-Status Species Not Addressed

**Attachment 4. Special-Status Species Not Addressed[1]**

| Latin Name | Common Name | Reason for Exclusion |
|---|---|---|
| PLANTS | | |
| *Abronia villosa* var. *aurita* | Chaparral sand-verbena | No suitable wash habitat. |
| *Ambrosia pumila* | San Diego ambrosia | No suitable alkali soils present |
| *Arctostaphylos glandulosa* ssp. *gabrielensis* | San Gabriel manzanita | Well below elevational range. |
| *Astragalus brauntonii* | Braunton's milk-vetch | No suitable chaparral habitat. |
| *Atriplex coulteri* | Coulter's saltbush | So suitable alkali soils. |
| *Brodiaea filifolia* | Thread-leaved brodiaea | No suitable clays or alkali soils. |
| *Calochortus clavatus* var. *gracilis* | Slender mariposa-lily | No suitable chaparral habitat. |
| *Calochortus weedii* var. *intermedius* | Intermediate mariposa-lily | Well outside of the geographic range. |
| *Centromadia pungens* ssp. *laevis* | Smooth tarplant | So suitable alkali soils. |
| *Cladium californicum* | California saw-grass | No suitable perennial marsh habitat. |
| *Claytonia peirsonii* ssp. *peirsonii* | Peirson's spring beauty | Well below elevational range. |
| *Dodecahema leptoceras* | Slender-horned spineflower | No suitable mature alluvial scrub habitat. |
| *Dudleya densiflora* | San Gabriel Mountain dudleya | Well outside of the geographic range. |
| *Dudleya multicaulis* | Many-stemmed dudleya | Well outside of the geographic range. |
| *Eriastrum densifolium* ssp. *sanctorum* | Santa Ana River woollystar | No suitable wash habitat. |
| *Eriogonum microthecum* var. *johnstonii* | Johnston's buckwheat | Well below elevational range. |
| *Fimbristylis thermalis* | Hot springs fimbristylis | No suitable perennial marsh habitat. |
| *Glyptostoma gabrielense* | San Gabriel chestnut | No suitable chaparral or woodland habitat. |
| *Lilium parryi* | Lemon lily | Well below elevational range. |
| *Linanthus concinnus* | San Gabriel linanthus | Well below elevational range. |
| *Monardella australis* ssp. *jokerstii* | Jokerst's monardella | Well below elevational range. |
| *Monardella breweri* ssp. *glandulifera* | Brown's Flat monardella | Well below elevational range. |
| *Monardella macrantha* ssp. *hallii* | Hall's monardella | Well below elevational range. |
| *Muhlenbergia californica* | California muhly | No suitable mesic canyon habitat. |
| *Muhlenbergia utilis* | Aparejo grass | Well outside of the geographic range. |
| *Navarretia prostrata* | Prostrate vernal pool navarretia | No suitable vernal pool habitat. |
| *Oreonana vestita* | Woolly mountain-parsley | Well below elevational range. |
| *Orobanche valida* ssp. *valida* | Rock creek broomrape | Well outside of the geographic range. |
| *Phacelia stellaris* | Brand's star phacelia | Well outside of the geographic range. |
| *Senecio aphanactis* | Chaparral ragwort | No suitable alkali soils. |
| *Sidalcea neomexicana* | Salt spring checkerbloom | No suitable alkali substrates. |
| *Streptanthus bernardinus* | Laguna Mountains jewelflower | Well outside of the geographic range. |
| *Symphyotrichum defoliatum* | San Bernardino aster | No suitable meadow habitat. |
| *Symphyotrichum greatae* | Greata's aster | No suitable mesic canyon habitat. |
| *Thelypteris puberula* var. *sonorensis* | Sonoran maiden fern | No suitable mesic canyon habitat. |
| *Thysanocarpus rigidus* | Rigid fringepod | Well outside of the geographic range. |
| *Viola pinetorum* ssp. *grisea* | Grey-leaved violet | Well outside of the geographic range. |
| INVERTEBRATES | | |
| *Atractelmis wawona* | Wawona riffle beetle | No suitable aquatic habitat. |
| *Callophrys mossii hidakupa* | San Gabriel Mountains elfin butterfly | Well below elevational range. |
| *Diplectrona californica* | California diplectronan caddisfly | No suitable stream habitat. |
| *Gonidea angulata* | Western ridged mussel | No suitable stream habitat. |

**Attachment 4. Special-Status Species Not Addressed[1]**

| Latin Name | Common Name | Reason for Exclusion |
|---|---|---|
| *Neolarra alba* | White cuckoo bee | Extirpated from Southern California. |
| *Rhaphiomidas terminatus abdominalis* | Delhi Sands flower-loving fly | No suitable sand dune habitat. |
| FISHES | | |
| *Catostomus santaanae* | Santa Ana sucker | No suitable aquatic habitat. |
| *Gila orcuttii* | Arroyo chub | No suitable aquatic habitat. |
| *Rhinichthys osculus* ssp. 8 | Santa Ana Speckled dace | No suitable aquatic habitat. |
| *Oncorhynchus mykiss irideus* pop. 10 | Steelhead - Southern California DPS | No suitable aquatic habitat. |
| AMPHIBIANS | | |
| *Anaxyrus californicus* | Arroyo toad | No suitable wash habitat. |
| *Batrachoseps gabrielli* | San Gabriel slender salamander | Well below elevational range. |
| *Ensatina eschscholtzii klauberi* | Large-blotched salamander | No suitable wetland habitat. |
| *Rana boylii* | Foothill yellow-legged frog | No suitable rocky pool creek habitat. |
| *Rana mucosa* | Southern mountain yellow-legged frog | No suitable aquatic habitat. |
| *Spea hammondii* | Western spadefoot | No suitable seasonal pool habitat. |
| *Taricha torosa* | Coast Range newt | No suitable aquatic habitat. |
| | | |
| *Arizona elegans occidentalis* | California glossy snake | No suitable wash habitat. |
| *Aspidoscelis hyperythra* | Orange-throated whiptail | Well outside of the geographic range. |
| *Coleonyx variegatus abbotti* | San Diego banded gecko | No suitable wash habitat. |
| *Crotalus ruber* | Red-diamond rattlesnake | Well outside of the geographic range. |
| *Emys marmorata* | Western pond turtle | No suitable ponded habitat. |
| *Salvadora hexalepis virgultea* | Coast patch-nosed snake | Not adequately sized to support animals. |
| *Thamnophis hammondii* | Two-striped gartersnake | No suitable aquatic habitat. |
| BIRDS | | |
| *Ammodramus savannarum* | Grasshopper sparrow | No suitable grassland habitat. |
| *Artemisiospiza belli belli* | Bell's sage sparrow | No suitable chaparral habitat. |
| *Asio otus* | Long-eared owl | Not adequately sized to support animals. |
| *Campylorhynchus brunneicapillus sandiegensis* | Coastal cactus wren | Well outside of the geographic range, no suitable cactus habitat. |
| *Coccyzus americanus occidentalis* | Western yellow-billed cuckoo | No suitable riparian habitat. |
| *Coturnicops noveboracensis* | Yellow rail | No suitable wetland habitat. |
| *Cypseloides niger* | Black swift | No suitable riparian habitat. |
| *Empidonax traillii extimus* | Southwestern willow flycatcher | No suitable riparian habitat. |
| *Laterallus jamaicensis coturniculus* | California black rail | No suitable wetland habitat. |
| MAMMALS | | |
| *Chaetodipus fallax fallax* | Northwestern San Diego pocket mouse | Well outside of geographic range. |
| *Dipodomys merriami parvus* | San Bernardino kangaroo rat | Well outside of geographic range. |
| *Dipodomys stephensi* | Stephen's kangaroo rat | Well outside of geographic range. |
| *Ovis canadensis nelsoni* | Desert bighorn sheep | Well outside of geographic range. |
| *Perognathus longimembris brevinasus* | Los Angeles pocket mouse | No suitable alluvial scrub habitat. |
| *Taxidea taxus* | American badger | Not adequately sized to support animals. |

Note:

[1] Special-status species reported from the region, but not addressed in this report due to habitat or geographic range.

## Attachment 5 – Project Species List

| **Attachment 5. Project Species List** | |
|---|---|
| Latin Name | Common Name |
| VASCULAR PLANTS | |
| DICOTYLEDONS | |
| ADOXACEAE | ELDERBERRY FAMILY |
| *Sambucus nigra* ssp. *caerulea* | Blue elderberry |
| ANACARDIACEAE | SUMAC FAMILY |
| *Rhus aromatica* | Fragrant sumac |
| *Toxicodendron diversilobum* | Poison oak |
| APOCYNACEAE | DOGBANE FAMILY |
| * *Nerium oleander* | Oleander |
| ASTERACEAE | ASTER FAMILY |
| *Ambrosia acanthicarpa* | Annual sandbur |
| *Artemisia californica* | California sagebrush |
| *Baccharis salicifolia* | Mulefat |
| *Baccharis sarothroides* | Broom baccharis |
| * *Centaurea melitensis* | Tocalote |
| *Ericameria pinifolia* | Pinebush |
| *Helianthus annuus* | Annual sunflower |
| * *Helminthotheca echioides* | Bristly ox-tongue |
| *Heterotheca grandiflora* | Telegraphweed |
| *Lepidospartum squamatum* | Scalebroom |
| * *Logfia gallica* | Narrowleaf cottonrose |
| *Pseudognaphalium canescens* | Wright's cudweed |
| * *Pulicaria paludosa* | Spanish false fleabane |
| *Senecio flaccidus* var. *douglasii* | Bush senecio |
| * *Sonchus asper* ssp. *asper* | Prickly sow thistle |
| *Xanthium strumarium* | Cocklebur |
| BORAGINACEAE | BORAGE FAMILY |
| *Eriodictyon trichocalyx* | Hairy yerba santa |
| *Pectocarya linearis* ssp. *ferocula* | Slender comb seed |
| BRASSICACEAE | MUSTARD FAMILY |
| * *Brassica fruticulosa* | Mediterranean cabbage |
| * *Hirschfeldia incana* | Short-pod mustard |
| *Nasturtium officinale* | Watercress |
| * *Raphanus sativus* | Jointed charlock |
| * *Sisymbrium orientale* | Indian hedge mustard |
| CACTACEAE | CACTUS FAMILY |
| *Opuntia littoralis* | Prickly pear |
| CHENOPODIACEAE | GOOSEFOOT FAMILY |
| * *Dysphania ambrosioides* | Mexican tea |
| * *Salsola tragus* | Russian thistle |
| CISTACEAE | ROCKROSE FAMILY |
| *Crocanthemum scoparium* var. *scoparium* | Peak rushrose |
| CONVOLVULACEAE | MORNINGGLORY FAMILY |
| *Cuscuta* sp. | Unid. dodder |
| CUCURBITACEAE | GOURD FAMILY |
| *Cucurbita foetidissima* | Calabazilla |
| EUPHORBIACEAE | SPURGE FAMILY |
| *Croton californicus* | Desert croton |
| *Croton setiger* | Turkey-mulleion |
| * *Euphorbia peplus* | Petty spurge |
| *Euphorbia serpillifolia* | Thyme-leafed spurge |

| Attachment 5. Project Species List | |
|---|---|
| Latin Name | Common Name |
| * *Ricinus communis* | Castor bean |
| FABACEAE | PEA FAMILY |
| *Acmispon glaber* | Deerweed |
| *Astragalus pomonensis* | Pomona milkvetch |
| * *Melilotus alba* | White sweet-clover |
| FAGACEAE | BEECH FAMILY |
| *Quercus agrifolia* | Coast live oak |
| GROSSULARIACEAE | CURRANT FAMILY |
| *Ribes aureum* | Golden currant |
| HYDROPHYLLACEAE | WATERLEAF FAMILY |
| *Emmenanthe penduliflora* | Whispering bells |
| *Phacelia ramosissima* | Branching phacelia |
| LAMIACEAE | MINT FAMILY |
| * *Marrubium vulgare* | Common horehound |
| * *Mentha spicata* | Spearmint |
| LYTHRACEAE | MYRTLE FAMILY |
| *Lagerstroemia indica* | Crepe myrtle |
| MORACEAE | MULBERRY FAMILY |
| * *Morus alba* | White mulberry |
| MYRSINACEAE | MYRSINE FAMILY |
| * *Lysimachia arvensis* | Scarlet pimpernel |
| MYRTACEAE | EUCALYPTUS FAMILY |
| * *Eucalyptus* sp. | Ornamental eucalyptus |
| OLEACEAE | OLIVE FAMILY |
| *Fraxinus uhdei* | Shamel ash |
| ONAGRACEAE | EVENING PRIMROSE FAMILY |
| *Camissoniopsis bistorta* | California sun cup |
| *Epilobium brachycarpum* | Annual fireweed |
| *Epilobium ciliatum* | Willow-herb |
| *Ludwigia peploides* | Floating water primrose |
| PLANTAGINACEAE | PLANTAIN FAMILY |
| *Penstemon spectabilis* | Showy penstemon |
| * *Plantago major* | Common plantain |
| * *Veronica anagallis-aquatica* | Water speedwell |
| PLANTANACEAE | SYCAMORE FAMILY |
| *Platanus racemosa* | California sycamore |
| * *Platanus ×hispanica* | London plane tree |
| PHRYMACEAE | LOPSEED FAMILY |
| *Mimulus guttatus* | Seep monkeyflower |
| POLEMONIACEAE | PHLOX FAMILY |
| *Navarretia hamata* | Hooked navarretia |
| POLYGONACEAE | BUCKWHEAT FAMILY |
| *Eriogonum fasciculatum* | California buckwheat |
| * *Rumex crispus* | Curly dock |
| PORTULACAEAE | PURSLANE FAMILY |
| * *Portulaca oleraceae* | Common purslane |
| RHAMNACEAE | BUCKTHORN FAMILY |
| *Frangula californica* | California coffeeberry |
| ROSACEAE | ROSE FAMILY |
| *Cercocarpus betuloides* | Birch leaf mountain mahogany |
| SALICACEAE | WILLOW FAMILY |

| Attachment 5. Project Species List | |
|---|---|
| Latin Name | Common Name |
| *Salix exigua* | Narrow-leaf willow |
| *Salix goodingii* | Gooding's black willow |
| SAPINDACEAE | SOAPBERRY FAMILY |
| * *Koelreuteria bipinnata* | Goldenrain tree |
| SOLANACEAE | NIGHTSHADE FAMILY |
| *Datura wrightii* | Jimsonweed |
| * *Nicotiana glauca* | Tree tobacco |
| ULMACEAE | ELM FAMILY |
| * *Ulmus parvifolia* | Chinese elm |
| MONOCOTYLEDONS | |
| ARECACEAE | PALM FAMILY |
| * *Washingtonia filifera* | California fan palm |
| CYPERACEAE | SEDGE FAMILY |
| *Carex* sp. | Unid. sedge |
| * *Cyperus involucratus* | Umbrella sedge |
| LILIACEAE | LILY FAMILY |
| *Asparagus asparagoides* | African asparagus fern |
| POACEAE | GRASS FAMILY |
| * *Bromus diandrus* | Ripgut brome |
| * *Bromus madritensis* ssp. *rubens* | Red brome |
| * *Cynodon dactylon* | Bermuda grass |
| * *Echinochloa colona* | Jungle rice |
| * *Ehrharta erecta* | Upright veldt grass |
| * *Festuca myuros* | Rattail sixweeks grass |
| * *Hordeum murinum* | Foxtail barley |
| * *Paspalum dilatatum* | Dallis grass |
| * *Polypogon monspeliensis* | Annual beard grass |
| * *Stipa miliacea* | Smilo grass |
| TYPHACEAE | CATTAIL FAMILY |
| *Typha latifolia* | Broadleaf cattail |
| VERTEBRATE ANIMALS | |
| REPTILIA | REPTILES |
| IGUANIDAE | IGUANID LIZARDS |
| *Sceloporus occidentalis* | Western fence lizard |
| *Uta stansburiana* | Side-blotched lizard |
| TEIIDAE | WHIPTAIL FAMILY |
| ** *Aspidosceleis tigris stejnegeri* | Coastal whiptail |
| AVES | BIRDS |
| CATHARTIDAE | NEW WORLD VULTURES |
| *Cathartes aura* | Turkey vulture |
| ACCIPITRIDAE | HAWKS, EAGLES, HARRIERS |
| *Buteo jamaicensis* | Red-tailed hawk |
| COLUMBIDAE | PIGEONS AND DOVES |
| *Zenaida macroura* | Mourning dove |
| TROCHILIDAE | HUMMINGBIRDS |
| *Calypte anna* | Anna's hummingbird |
| TYRANNIDAE | TYRANT FLYCATCHERS |
| *Sayornis nigricans* | Black phoebe |
| CORVIDAE | CROWS AND RAVENS |
| *Aphelocoma californica* | California scrub jay |
| *Corvus brachyrhynchos* | American crow |

| **Attachment 5. Project Species List** | |
|---|---|
| Latin Name | Common Name |
| AEGITHALIDAE | BUSHTITS |
| *Psaltriparus minimus* | Bushtit |
| MIMIDAE | MOCKINGBIRDS AND THRASHERS |
| *Mimus polyglottos* | Northern mockingbird |
| EMBERIZIDAE | SPARROWS AND TANAGERS |
| *Pipilo maculatus* | Spotted towhee |
| *Pipilo redivivum* | California towhee |
| *Melospiza melodia* | Song sparrow |
| FRINGILLIDAE | FINCHES |
| *Carpodacus mexicanus* | House finch |
| *Carduelisp saltria* | Lesser goldfinch |
| MAMMALIA | MAMMALS |
| CRICETIDAE | PACKRAT FAMILY |
| *Neotoma* sp. | Unid. woodrat |
| SCIURIDAE | SQUIRRELS |
| *Spermophilus beecheyi* | California ground squirrel |
| CANIDAE | FOXES, WOLVES, AND COYOTES |
| *Canis latrans* | Coyote |

Species introduced to California are indicated by an asterisk. Special-status species are indicated by two asterisks. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season (amphibians are active during rains, reptiles during summer, some birds (and bats) migrate out of the area for summer or winter, some mammals hibernate, many plants are identifiable only in spring). Plants were identified using keys, descriptions, and illustrations in Baldwin et al (2012). Plant taxonomy and nomenclature generally follow Baldwin et al. (2012). Wildlife taxonomy and nomenclature generally follow Stebbins (2003) for amphibians and reptiles, AOU (1998) for birds, and Wilson and Ruff (1999) for mammals.

## Attachment 6 – Project Photos



Photo 1: East-facing view of the Development Area with a small patch of wetland vegetation in the foreground.



Photo 2: Northwest-facing overview of the Development Area in the western portion of the Project Site.



Photo 3: East-facing view of the disturbed habitat within the central portion of the Development Area, within the western half of the Project Site.



Photo 4: Northwest-facing overview of the Conservation Area showing a stand of California buckwheat scrub and a narrow band of mulefat thickets.



Photo 5: Northeast-facing overview of the Conservation Area showing a stand of California buckwheat scrub and a narrow band of mulefat thickets.



Photo 6: Northeast-facing overview of cattail marshes at one of the side drainages within the Conservation Area.



Photo 7: Close-up view of dense cattail marshes at one of the side drainages within the Conservation Area.



Photo 8: North-facing view of cattail marshes at one of the side drainages within the Development Area.



Photo 9: West-facing view of California buckwheat scrub within the Conservation Area.



Photo 10: East-facing view of California buckwheat scrub within the Conservation Area.



Photo 11: Southwest-facing view of patchy California buckwheat scrub along the southern access road within the Development Area.



Photo 12: West-facing view of patchy California buckwheat scrub and disturbed habitat along the southern access road within the Development Area.

**Appendix A – San Bernardino Kangaroo Rat and California Gnatcatcher Habitat Assessment for a 19-acre parcel located in Upland, San Bernardino County, California.**

July 28, 2022

Robert Dalquest, City of Upland
Carl Winter, LSA

***Subject: San Bernardino Kangaroo Rat and California Gnatcatcher Habitat Assessment for a 19-acre parcel located in Upland, San Bernardino County, California***

Dear Mr. Dalquest and Mr. Winter:

This letter report presents the results of a focused habitat assessment for the federally and state endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus)* (SBKR) and federally threatened California gnatcatcher (*Polioptila californica*) (CAGN) conducted at an approximate 19-acre parcel (biological study area or study area) located in Upland, San Bernardino County, California. This was prepared in support of a proposed residential subdivision (Tract 20245). A previous general biological report was prepared by RCA Associates in May 2022.

## PROJECT LOCATION

The study area is located north of East 15th Street and Red Hill North Drive, east of Fernando Avenue and west of Cerito Rojo Drive in the City of Upland, San Bernardino County (Figure 1). The study area is surrounded by urban development, with the Upland Hills Country Club located to the north, Red Hill Country Club to the southweast, the Dry Dock Depot Boat and RV Storage located to the southwest, and residential development (including city streets) abutting the study area to the west, south, and east.

## Methodology

Permitted SBKR and CAGN biologist Mikael Romich (USFWS 10(A)1(a) permit # TE-068799-5 and state scientific collecting permit #7043) conducted a habitat assessment for SBKR and CAGN for the study site on June 3 and July 1, 2022. The study site was assessed on foot with meandering transects and noting vegetation and soil characteristics that would be suitable for SBKR. The condition of the vegetation was noted to determine suitability for CAGN. All plant and wildlife species observed were recorded.

## SITE DESCRIPTION

The survey area was formerly a water detention basin and thus the far western part of the basin has two large culverts, as well as an overspill area. There was pooled water present and hydric vegetation at the base of the larger culvert and western toad (*Anaxyrus boreas*) tadpoles were observed. In addition, five drainage swales appear to enter the site's basin area from the Upland Hills Country Club to the north where small patches of hydric vegetation were observed.

# Figure 1. Survey Area Location



Hydric vegetation observed included cattails, sedges, willow herb, curly dock, stinging nettle, seep monkeyflower, and water primrose. The swales in the east part of the survey area support a narrow riparian swath consisting of sandbar willow (*Salix exigua*), western sycamore (*Platanus racemosa*), and mulefat (*Baccharis salicifolia*).

Much of the western part of the survey area was mechanically cleared between 2020 and 2021; it is currently largely ruderal with sparse vegetation as it recovers from this disturbance. Seedlings and short-stature shrub species common in a sage scrub community were observed in the ruderal areas, such as California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), hairy yerbasanta (*Eriodictyon trichocalyx*), scalebroom (*Lepidospartum squamatum*), and deerweed (*Acmispon glaber*). Other common species included jimsonweed (*Datura stramonium*), ribwort plantain (*Plantago lanceolata*), California poppy (*Eschscholzia californica*), holly leaf navarretia (*Navarretia atractyloides*), and prickly lettuce (*Lactuca serriola*). Not subject to mechanical clearing is a narrow strip of habitat north of and abutting East 15th Street that is California buckwheat scrub. In addition, the eastern portion of survey area has been cleared in the past but is now recovered and is dominated by a native California sagebrush-California buckwheat scrub with subdominant species as described above.

## RESULTS AND DISCUSSION

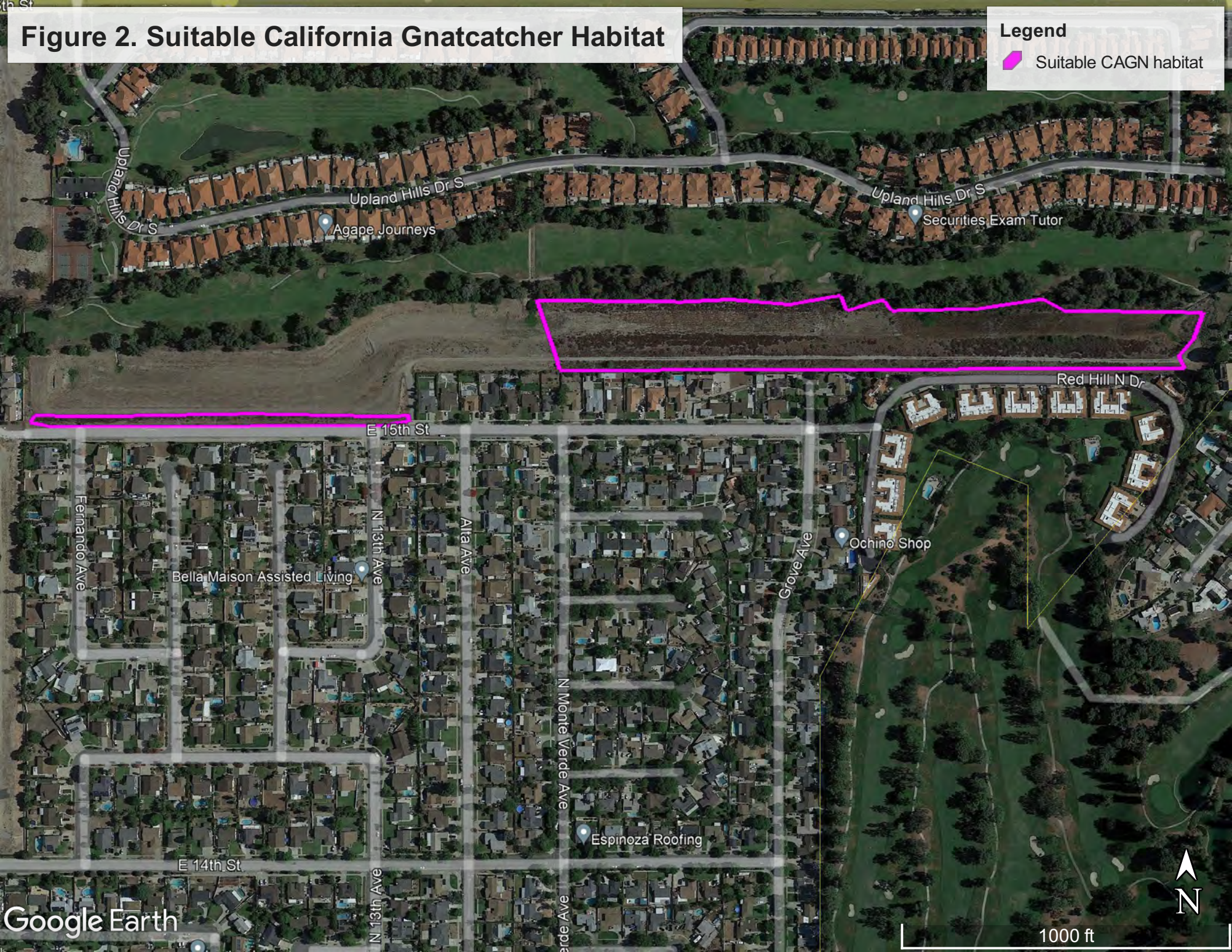
### SBKR Habitat Assessment

The habitat assessment determined that the study site does not provide suitable habitat characteristics for SBKR, primarily due to the lack of sandy substrates and absence of alluvial fan terraces. A review of 1938 aerial shows that even historically there was not evidence of fluvial processes at the study area. The soils on the basin bottom were compacted, which would also not be conducive to SBKR. Finally, the study area is outside of the current and historical known range of SBKR and does not overlap USFWS designated critical habitat for SBKR. SBKR would not occur at the study area.

### CAGN Habitat Assessment

The habitat assessment determined that the study area has habitat that could be suitable for CAGN, which consists of approximately 0.9 acre of California buckwheat scrub on the south facing slope north of and abutting East 15th Street in the western part of the survey area (Figure 2). In addition, 8.8 acres of habitat in the eastern part of the survey area was determined as suitable for CAGN (Figure 2). However, there are number of factors that suggest CAGN have a low potential to occur in the survey area. First, the study area occurs as a small island in a large matrix of urban development, making discovery, colonization, and dispersal of the site potentially difficult. Second, existing CAGN occupied habitat is not recorded nearby; the closest CAGN record is 5 miles to the northeast in an area that does not have any records since 1999. The next closest records occur 9 miles to the west near Bonelli Park where they appear to be regularly present. Finally, CAGN were not detected during the June 3 or July 1, 2022 surveys, nor during five (5) surveys conducted by RCA (2022) between January 25 and April 22, 2022. Considering these factors, CAGN have a low potential to occur in the survey area.

# Figure 2. Suitable California Gnatcatcher Habitat



Least Bell’s Vireo

In the eastern portion of the survey area, narrow strips of riparian vegetation at the north and south edges of the basin combined with non-native woodland habitat that separates the basin from the golf course, could provide suitable breeding habitat to the state and federally listed endangered least Bell’s vireo (*Vireo bellii pusillus*) (Figure 3). Due to isolation of the survey area from other suitable habitat and the small size of the suitable habitat, least Bell’s vireo is considered to have a low potential to occur in the eastern part of the survey area.

### Species Observed

Twenty-four avian species were observed during the habitat assessment: mourning dove, Anna's hummingbird, Cooper's hawk, red-tailed hawk, red shouldered hawk, acorn woodpecker, black phoebe, Say's phoebe, Cassin's kingbird, California scrub-jay, American crow, common raven, oak titmouse, barn swallow, cliff swallow, bushtit, Bewick’s wren, American robin, northern mockingbird, house finch, lesser goldfinch, spotted towhee, hooded oriole, and common yellowthroat.

Other species observed were western toad (tadpoles), western whiptail (*Aspidoscelis tigris*), and desert cottontail (*Sylvilagus audubonii*). Likely due to the regular presence of ribwort plantain, a commonly used caterpillar host plant, butterfly activity in the basin area was high. In the western part of the survey area, monarch (*Danaus plexippus*) was observed, although its host plant (milkweed) was not recorded.

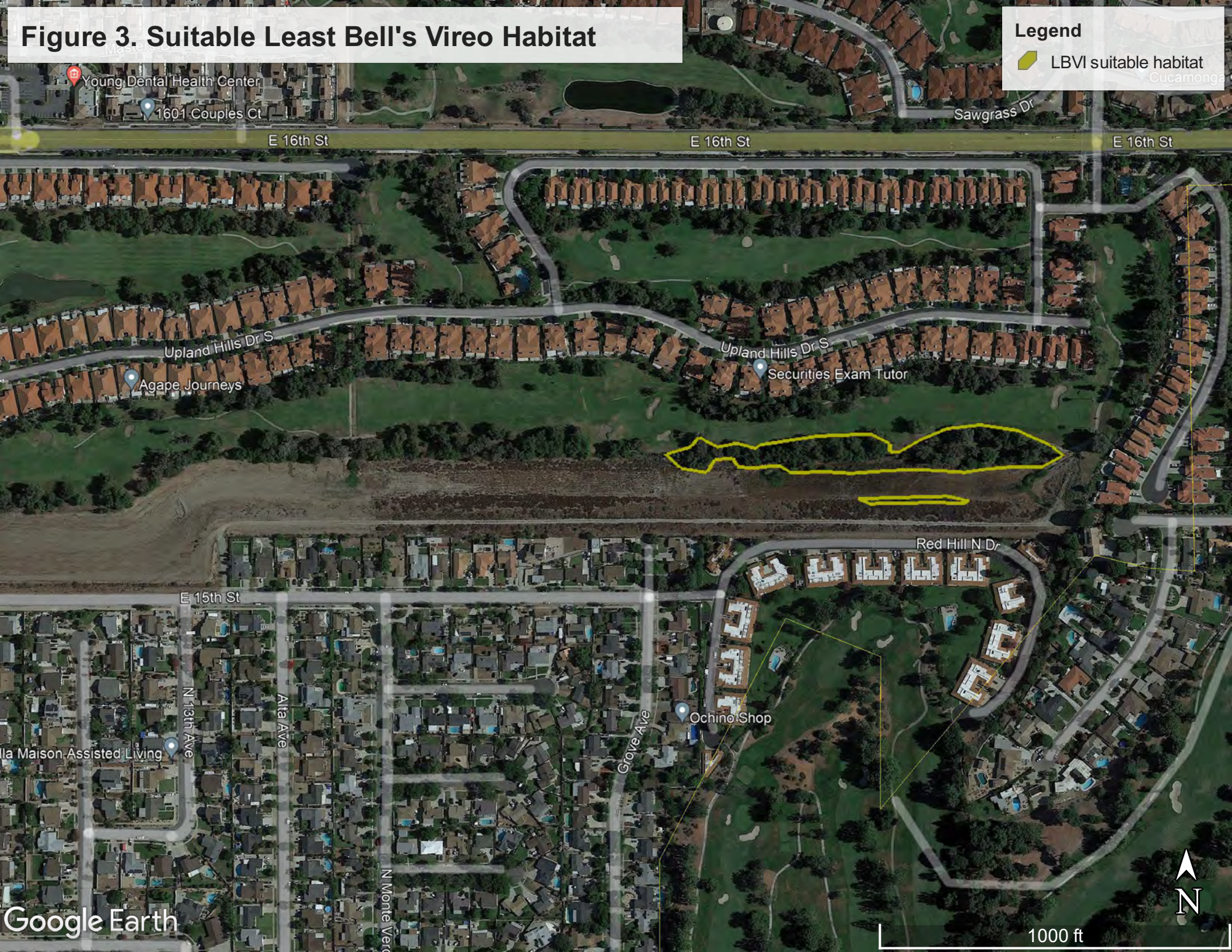
## Conclusion and Recommendations

The western part of the survey area was mechanically disturbed between 2020 and 2021 when much of the vegetation was cleared and is currently largely ruderal with sparse vegetation cover. The eastern part of the survey area is dominated by California sagebrush-California buckwheat scrub with some riparian and wetland species present. The study area was confirmed not to be suitable for SBKR and is outside of their current or historical range. Approximately 9.7 acres of California buckwheat scrub and California sagebrush-California buckwheat scrub habitat was found to be potentially suitable for CAGN on the site, but due to distance from other known occupied areas and that none have been detected during previous field work, CAGN have a low potential to occur. To confirm they are absent, a focused breeding or non-breeding survey may be warranted.

A small patch of potentially suitable habitat for breeding least Bell’s vireo was observed in the eastern part of the survey area. Should project-related activities need to remove this habitat, a focused breeding survey for least Bell’s vireo may be warranted.

A total of seven (8) areas of hydric vegetation were observed, one associated with the culverts at the western end of the basin, four small patches due to golf course drainage, one larger patch at east end of basin, and two narrow strips of riparian vegetation at the north and south parts of the basin in the eastern portion of the survey area. The presence of these drainages may warrant further investigation, such as an updated formal jurisdictional delineation, to determine if removal during project

# Figure 3. Suitable Least Bell's Vireo Habitat



development may require regulatory permits from agencies such as the California Regional Water Control Board, California Department of Fish and Wildlife, and/or the Army Corps of Engineers.

I certify that the information submitted in this report is complete and accurate to the best of my knowledge and belief. Please let me know if you have any questions on this report. I can be reached at (909) 810-0718 or mike.romich@gmail.com.

Sincerely,



Mikael Romich
Senior Biologist
ORIGIN BIOLOGICAL
C+1 909.810.0718
romich@originbioloy.com
originbiology.com

## Literature Cited

RCA Associates. 2022. General Biological Resources Assessment (APN: 3105-171-08). Prepared for: The Colonies Partners, LLC. 37 p.

**Appendix A – Site Photographs**




Photo 1. Example of the ruderal habitat within the basin in the central part of the survey area. On the southern slope scalebroom shrubs are evident.




Photo 2. Example of the ruderal habitat within the basin in the western part of the survey area.



Photo 3. Example of California buckwheat scrub located in the southwestern part of the survey area that is suitable for California gnatcatcher.



Photo 4. Example of California sagebrush-California buckwheat scrub located in the eastern part of the survey area that is suitable for California gnatcatcher.



Photo 5. Example of California sagebrush-California buckwheat scrub located in the eastern part of the survey area that is suitable for California gnatcatcher.



Photo 6. Example of one of the hydrophytic vegetation areas in the survey area supported by golf course run-off.




Photo 7. In the background is riparian habitat and non-native woodland in the eastern part of the survey area that that is suitable for least Bell's vireo.




Photo 8. Example of mulefat scrub in the eastern part of the survey area that that is suitable for least Bell's vireo.

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# APPENDIX D-2

# SAN BERNARDINO KANGAROO RAT AND CALIFORNIA GNATCATCHER ASSESSMENT

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January 10, 2023

Robert D. Dalquest, AICP, MPA, MURP
Development Services Director, City of Upland
460 N. Euclid Avenue, Upland, CA 91786

***Subject: San Bernardino Kangaroo Rat and California Gnatcatcher Habitat Assessment for a 26.2- acre parcel located in Upland, San Bernardino County, California***

Dear Mr. Dalquest:

This letter report presents the results of a focused habitat assessment for the federally and state endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus)* (SBKR) and federally threatened California gnatcatcher (*Polioptila californica*) (CAGN) conducted for Diversified Pacific at an approximate 26.2-acre parcel (biological study area or study area) located in Upland, San Bernardino County, California. This was prepared in support of a proposed residential subdivision (Tract 20245). A previous general biological report was prepared by RCA Associates in May 2022.

## PROJECT LOCATION

The study area is located north of East 15th Street and Red Hill North Drive, east of Fernando Avenue, and west of Campus Avenue in the City of Upland, San Bernardino County (Figure 1). The study area is surrounded by urban development, with the Upland Hills Country Club located to the north, Red Hill Country Club to the southweast, the Dry Dock Depot Boat and RV Storage located to the south, and residential development (including city streets) abutting the study area to the west, south, and east.

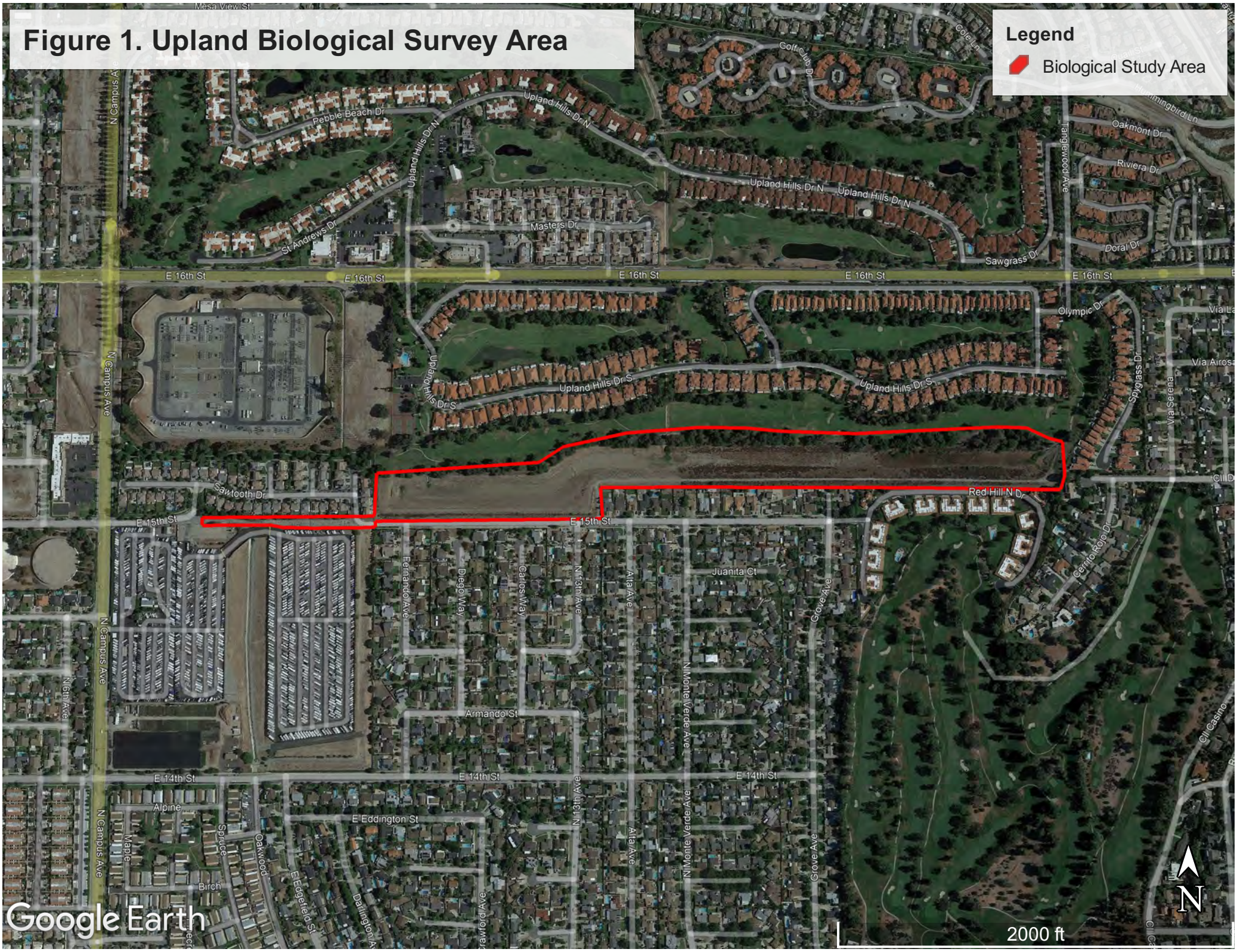
## Methodology

Permitted SBKR and CAGN biologist Mikael Romich (USFWS 10(A)1(a) permit # TE-068799-5 and state scientific collecting permit #7043) conducted a habitat assessment for SBKR and CAGN for the study area on June 3, July 1, 2022, and January 9, 2023. The study area was assessed on foot with meandering transects while noting vegetation and soil characteristics that would be suitable for SBKR. The condition of the vegetation was noted to determine suitability for CAGN. All plant and wildlife species observed were recorded.

## SITE DESCRIPTION

Most the study area was formerly a water detention basin and thus the far western part of the basin has two large culverts, as well as an overspill area. There was pooled water present and hydric vegetation at the base of the larger culvert and western toad (*Anaxyrus boreas*) tadpoles were observed. In addition, five drainage swales appear to enter the site's basin area from the Upland Hills

# Figure 1. Upland Biological Survey Area



Country Club to the north where small patches of hydric vegetation were observed. Hydric vegetation observed included cattail (*Typha latifolia*), sedges, willowherb (*Epilobium* species), curly dock (*Rumex crispus*), stinging nettle (*Urtica dioica*), seep monkeyflower (*Erythranthe guttata*), and water primrose (*Ludwigia* species); Pacific tree frog (*Pseudacris regilla*) was heard during the January 2023 field visit. The swales in the east part of the survey area support a narrow riparian swath consisting of sandbar willow (*Salix exigua*), western sycamore (*Platanus racemosa*), and mulefat (*Baccharis salicifolia*). During the January 2023 field visit, it was observed that maintenance had been conducted within the eastern basin areas such that the cattails had been removed likely with heavy machinery and stockpiled nearby.

Much of the western part of the survey area was mechanically cleared between 2020 and 2021; it is currently largely ruderal with sparse vegetation as it recovers from this disturbance. Seedlings and short-stature shrub species common in a sage scrub community were observed in the ruderal areas, such as California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), hairy yerbasanta (*Eriodictyon trichocalyx*), scalebroom (*Lepidospartum squamatum*), and deerweed (*Acmispon glaber*). Other common species included jimsonweed (*Datura stramonium*), ribwort plantain (*Plantago lanceolata*), California poppy (*Eschscholzia californica*), holly leaf navarretia (*Navarretia atractyloides*), and prickly lettuce (*Lactuca serriola*). Not subject to mechanical clearing is a narrow strip of habitat north of and abutting East 15th Street that is California buckwheat scrub with patches of hairy yerbasanta and some California sagebrush, black sage (*Salvia mellifera*), and hollyleaf cherry (*Prunus ilicifolia*). In addition, the eastern portion of survey area has been cleared in the past but is now recovered and is dominated by a native California sagebrush-California buckwheat scrub with subdominant species as described above.

## RESULTS AND DISCUSSION

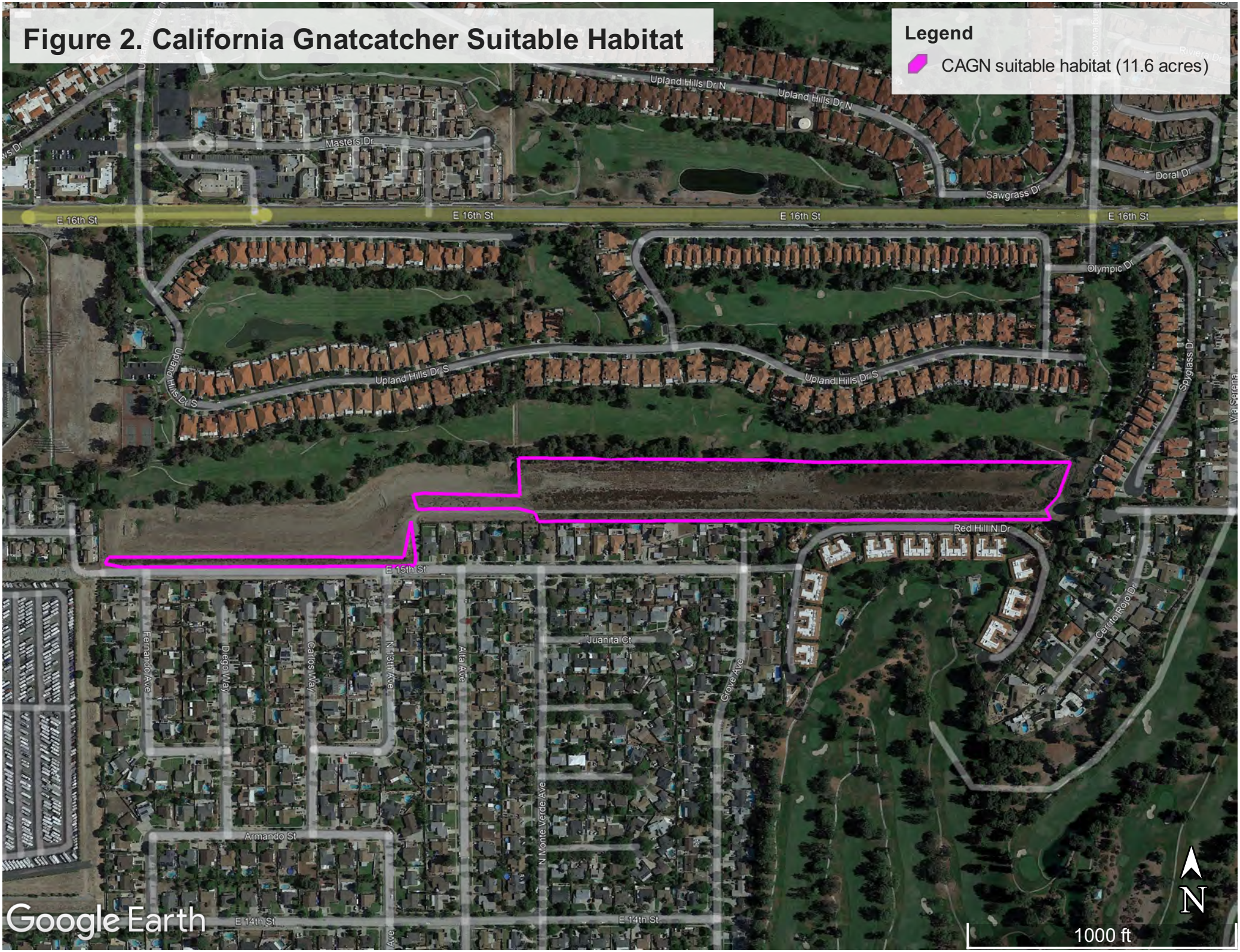
### SBKR Habitat Assessment

The habitat assessment determined that the study site does not provide suitable habitat characteristics for SBKR, primarily due to the lack of sandy substrates and absence of alluvial fan terraces. A review of 1938 aerial shows that even historically there was not evidence of fluvial processes at the study area. The soils on the basin bottom were compacted, which would also not be conducive to SBKR. Finally, the study area is outside of the current and historical known range of SBKR and does not overlap USFWS designated critical habitat for SBKR. SBKR would not occur at the study area.

### CAGN Habitat Assessment

The habitat assessment determined that the study area has habitat that could be suitable for CAGN, which consists of approximately 1.0 acre of California buckwheat scrub on the south facing slope north of and abutting East 15th Street in the western part of the study area (Figure 2). In addition, 10.6 acres of habitat in the eastern part of the survey area was determined as suitable for CAGN (Figure 2). However, there are number of factors that suggest CAGN have a low potential to occur in the survey area. First, the study area occurs as a small island in a large matrix of urban development, making discovery, colonization, and dispersal potentially challenging. Second, existing known CAGN

# Figure 2. California Gnatcatcher Suitable Habitat



occupied habitat is not recorded nearby; the closest CAGN record is 5 miles to the northeast in an area that does not have any records since 1999. The next closest records occur 9 miles to the west near Bonelli Park where they appear to be regularly present. Finally, CAGN were not detected during the January 9 2023, June 3 or July 1, 2022 surveys, nor during five (5) surveys conducted by RCA (2022) between January 25 and April 22, 2022. Considering these factors, CAGN have a low potential to occur in the survey area.

Least Bell's Vireo

In the eastern portion of the survey area, narrow strips of riparian vegetation at the north and south edges of the basin combined with non-native woodland habitat that separates the basin from the golf course, could provide suitable breeding habitat to the state and federally listed endangered least Bell's vireo (*Vireo bellii pusillus*) (Figure 3). Due to isolation of the survey area from other suitable habitat and the small size of the suitable habitat (2.5 acres), least Bell's vireo is considered to have a low potential to occur in the eastern part of the survey area.

### Species Observed

Thirty-one avian species were observed during the habitat assessment: Canada goose (on golf course), American white pelican (overhead), mourning dove, Anna's hummingbird, Cooper's hawk, red-tailed hawk, red shouldered hawk, acorn woodpecker, northern flicker, Nuttall's woodpecker, black phoebe, Say's phoebe, Cassin's kingbird, California scrub-jay, American crow, common raven, oak titmouse, barn swallow, cliff swallow, bushtit, Bewick's wren, American robin, northern mockingbird, house finch, lesser goldfinch, white-crowned sparrow, spotted towhee, California towhee, hooded oriole, yellow-rumped warbler, and common yellowthroat.

Other species observed were western toad (tadpoles), Pacific tree frog, western whiptail (*Aspidoscelis tigris*), and desert cottontail (*Sylvilagus audubonii*). Likely due to the regular presence of ribwort plantain, a commonly used caterpillar host plant, butterfly activity in the basin area was high. In the western part of the survey area, monarch (*Danaus plexippus*) was observed, although its host plant (milkweed) was not recorded.

## Conclusion and Recommendations

The western part of the survey area was mechanically disturbed between 2020 and 2021 when much of the sage scrub vegetation was cleared; it is currently recovering from this disturbance with scattered young shrubs, such as California buckwheat and deerweed, along with grasses and other ruderal vegetation. The eastern part of the survey area is dominated by California sagebrush-California buckwheat scrub with some riparian and wetland vegetation present, although the cattail patches had been mechanically removed between the July 2022 and January 2023 field visits. The study area was confirmed not to be suitable for SBKR and is outside of their current or historical range. Approximately 9.7 acres of California buckwheat scrub and California sagebrush-California buckwheat scrub habitat was found to be potentially suitable for CAGN on the site, but is judged to have a low potential to occur. To confirm they are absent, a focused breeding or non-breeding survey may be warranted.

# Figure 3. Least Bell's Vireo Suitable Habitat



A small patch of potentially suitable habitat for breeding least Bell's vireo was observed in the eastern part of the survey area. Should project-related activities need to remove this habitat, a focused breeding survey for least Bell's vireo may be warranted.

A total of seven (8) areas of hydric vegetation were observed, one associated with the culverts at the western end of the basin, four small patches due to golf course drainage, one larger patch at east end of basin, and two narrow strips of riparian vegetation at the north and south parts of the basin in the eastern portion of the survey area. The presence of these drainages may warrant further investigation, such as an updated formal jurisdictional delineation, to determine if removal during project development may require regulatory permits from agencies such as the California Regional Water Control Board, California Department of Fish and Wildlife, and/or the Army Corps of Engineers. During the January 2023 survey it was observed that the large eastern patch of cattail as well as others appear to have been mechanically removed and stockpiled nearby.

I certify that the information submitted in this report is complete and accurate to the best of my knowledge and belief. Please let me know if you have any questions on this report. I can be reached at (909) 810-0718 or mike.romich@gmail.com.

Sincerely,



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## Literature Cited

RCA Associates. 2022. General Biological Resources Assessment (APN: 3105-171-08). Prepared for: The Colonies Partners, LLC. 37 p.

**Appendix A – Site Photographs**




Photo 1. Example of the ruderal habitat within the basin in the central part of the survey area. On the southern slope scalebroom shrubs are evident.




Photo 2. Example of the ruderal habitat within the basin in the western part of the survey area.



Photo 3. Example of California buckwheat scrub located in the southwestern part of the survey area that is suitable for California gnatcatcher.



Photo 4. Example of California sagebrush-California buckwheat scrub located in the eastern part of the survey area that is suitable for California gnatcatcher.



Photo 5. Example of California sagebrush-California buckwheat scrub located in the eastern part of the survey area that is suitable for California gnatcatcher.



Photo 6. Example of one of the hydrophytic vegetation areas in the survey area supported by golf course run-off.



Photo 7. July 2022 example of a hydrophytic vegetation area in the survey area supported by golf course run-off.



Photo 8. January 2023 after hydrophytic vegetation removal activities.




Photo 9. Eastern part of study area where cattails were removed and stockpiled nearby.




Photo 10. In the background is riparian habitat and non-native woodland in the eastern part of the survey area that that is suitable for least Bell's vireo.



Photo 11. Example of mulefat scrub in the eastern part of the survey area that that is suitable for least Bell's vireo.



Photo 12. Western part of survey area that is developed with urban landscaping.

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# APPENDIX D-3

# NESTING BIRD AND CALIFORNIA GNATCATCHER ASSESSMENT

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# Summary Report

**To:** Joshua Winter, Senior Planner, Planning Division,
Development Services Department, City of Upland
**From:** Eric Dugan, Dugan Biological Services (DBS)
**Report Date:** 5/10/2023
**Re:** Villa Serena Specific Plan; Nesting Bird and
California Gnatcatcher Habitat Assessment

---

At the request of The Colonies Partners, L.P., DBS conducted a general habitat assessment for California Gnatcatcher and nesting birds at the proposed Villa Serena Specific Plan Project (APNs1045-121-04, 1045-151-35, 0207-483-46 and 0207-483-46) site in Upland, California. The site is situated in an urban area north of East 15th Street and Red Hill North Drive, east of Fernando Avenue, and west of Cerrito Rojo Drive in the city of Upland, San Bernardino County, California. Surrounding land use includes two country clubs, an RV and boat storage facility, and numerous residential developments. This summary report presents the methods and results of the habitat assessments, and discusses mitigation recommendations associated with construction.

**Methods**

For purposes of reporting, the Project site was divided into two sections. The Western section includes the locations of 65 proposed single-family homes, associated roads, and residential infrastructure (Photos 1-2). The Eastern section includes part of the existing basin where impacts will be limited to minimal grading, and where the preservation of native habitats is planned (Photos 3-4). Figure 2 of the Biological Resources Technical Report (Aspen, 2023) associated with the project illustrates the approximate boundaries of the western and eastern portions of the site.

DBS Senior Biologist, Dr. Eric Dugan conducted a pedestrian visual-encounter survey (Table 1) of the site on 16 April, 2023. Binoculars were used to locate, identify, and observe behavior of native avian species. When possible, avian calls and songs were used to identify species present on site. The survey provided 100% coverage of the Project, and included suitable habitats (e.g., tree and hedge rows) immediately adjacent to the Project limits. Field efforts focused on identifying and determining suitable nesting habitats for native bird species, and determining habitat suitability for California Gnatcatcher (*Polioptila californica*).

**Table 1.** Site visit and habitat assessment details

| DATE | PERSONNEL | FIELD CONDITIONS |
|---|---|---|
| 4/16/23 | Eric Dugan | Time: 0830-1015<br>Temperature: 52 F (start), 55 F (end);<br>Winds: W6 mph (start), W4 mph (end)<br>Visibility: Good, partly cloudy |

## Results

*Nesting Bird Habitat Assessment*

A total of 19 native avian species (Sibley, 2000) were observed during the site visit (Table 2). Vegetation communities found on-site included ruderal, hydrophytic, and mixed California buckwheat scrub. A mature tree line is located along the Northern edge of the site, consisting primarily of non-native tree species that have encroached from the golf course located to the north. Previous reports (RCA, 2018; Aspen, 2023) provide additional details and discussion on the species composition and abundance of vegetation communities found on site.

Nine native bird species were observed on the Western half of the project (Table 2). No special-status species were observed. The Western half of the site has been mechanically cleared in the recent past, resulting in sparse ruderal vegetation dominating this portion of the site. Small patches of hydrophytic vegetation are found in association with several swales and runoff culverts entering the site from surrounding urban sources. Nesting habitats for most native species were largely absent within the cleared ruderal habitats. The Western half of the site lacks mature native vegetative structure, significantly reducing suitability for nesting birds. Avian activity, abundance, and diversity were all notably low in the Western half of the site.

Fifteen native bird species were observed on the Eastern half of the project (Table 2). No special-status species were observed. The Eastern half of the site was generally less disturbed and had not undergone mechanical clearance as recently as the Western half. As a result, native vegetation was more diverse and became increasingly dense from west to east. A mixed California buckwheat scrub was the dominant vegetation community, being most abundant and well-developed on sloped areas. A mosaic of smaller interspersed areas of ruderal and hydrophytic vegetation was also noted. Localized patches of hydrophytic vegetation were found in association with swales and runoff culverts entering the site from surrounding urban sources. Avian activity, abundance, and diversity were highest in the Eastern half of the site.

*California Gnatcatcher Habitat Assessment*

California Gnatcatcher was not observed on site during the habitat assessment. Suitable habitat consisting of dense mixed California buckwheat scrub was observed along the Eastern half of the site. As part of the habitat assessment, the biologist spent time

listening for the distinctive calls of California Gnatcatcher. None were heard during the site visit.

**Discussion**

*Nesting Bird Habitat Assessment*

The Project proposes the development of 65 single family homes located in the Western half of the site, whereas the Eastern half of the site will remain preserved. This approach will result in the majority of work occurring in areas largely absent of suitable nesting habitats. The construction plan to avoid impacts to the Eastern half of the site, will serve to preserve the highest quality nesting bird habitat and ensure native birds continued access to the best foraging and nesting habitats found on site. Additionally, the absence of special-status species further suggests that overall impacts to nesting birds are minimal.

In order to mitigate impacts during construction, vegetation removal should occur outside of the recognized nesting bird season which generally runs from February 15th to August 31st. If construction is scheduled to occur during the nesting season, a pre-construction nesting bird survey is recommended in order to locate and identify any active nests. If active nests are identified, additional mitigation measures (e.g., avoidance buffers and biological monitoring) should then be implemented to prevent the take of an active nest.

*California Gnatcatcher*

Although suitable habitat was observed on site, the likelihood of California Gnatcatcher inhabiting the site is low. Suitable habitats on site are immediately adjacent to and bound by numerous residential developments, a maintained dirt access road, and an active golf course. California Gnatcatcher are typically found in areas of larger, intact patches of suitable habitat. Currently occupied California Gnatcatcher habitats are not known within 5-miles of the site (Aspen, 2023), and recolonization of the site remains unlikely. Additionally, focused surveys conducted between January-April, 2022 and June-July, 2022 failed to detect the presence of the species.

***Reference**s*

Aspen Environmental Group (2023). Biological Technical Report. Villa Serena Specific Plan (Tracer No. 20245) Project

RCA Associates Inc.(2018). General Biological Resources Assessment. Upland Colonies 59, Upland, San Bernardino County, California.

Sibley, D.A. (2000). The Sibley Guide to Birds. First Edition. Chanticleer Press Incorporated, New York, USA.

If you have any questions or require additional information, please contact Dr. Eric A. Dugan at eric.dugan@dbsbio.com or (951) 545-2457.

**Table 2.** Avian species observed on-site during the habitat assessment, with location of observation and special status designation.

| COMMON NAME | OBSERVATION LOCATION | SPECIAL STATUS |
|---|---|---|
| American Crow<br>*Corvus brachyrhynchos* | Western Half | No |
| Anna's Hummingbird<br>*Calypte anna* | Eastern and Western Halves | No |
| Barn Swallow<br>*Hirundo rustica* | Eastern Half | No |
| Bewick's Wren<br>*Thyromanes bewickii* | Eastern Half | No |
| Black Phoebe<br>*Sayornis nigricans* | Eastern Half | No |
| Bushtit<br>*Psaltriparus minimus* | Eastern Half | No |
| California Towhee<br>*Melozone crissalis* | Eastern and Western Halves | No |
| Cooper's Hawk<br>*Accipiter cooperii* | Eastern Half | No |
| House Finch<br>*Haemorhous mexicanus* | Eastern and Western Halves | No |
| Lesser Goldfinch<br>*Spinus psaltria* | Eastern Half | No |
| Northern Mockingbird<br>*Mimus polyglottos* | Eastern and Western Halves | No |
| Mourning Dove<br>*Zenaida macroura* | Western Half | No |
| Bushtit<br>*Psaltriparus minimus* | Eastern Half | No |
| Red-shouldered Hawk<br>*Buteo lineatus* | Eastern Half | No |
| Red-tailed Hawk<br>*Buteo jamaicensis* | Western Half | No |
| Western Scrub Jay<br>*Aphelocoma californica* | Eastern and Western Halves | No |
| Western Kingbird<br>*Tyrannus verticalis* | Eastern Half | No |
| White-crowned Sparrow<br>*Zonotrichia leucophrys* | Eastern and Western Halves | No |

**Photo 1.** Large culvert near the Western end of the site, facing east.



**Photo 2.** Ruderal vegetation within the Western half of the site, facing east.



**Photo 3.** Potential nesting habitats along the Eastern half of the site, facing east.



**Photo 4.** California buckwheat scrub along the Eastern half of the site, facing north.



# APPENDIX D-4

# AQUATIC RESOURCES DELINEATION REPORT

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# AQUATIC RESOURCES DELINEATION REPORT
# Villa Serena Specific Plan (Tract No. 20245) Project

**Prepared for:**

City of Upland, Development Services Department
460 N. Euclid Avenue
Upland, CA 91786

**Prepared by:**

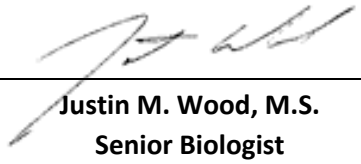
Aspen Environmental Group
615 N. Benson Avenue, Suite E
Upland, CA 91786

**Last Updated September 2023**

# Aquatic Resources Delineation Report

## Villa Serena Specific Plan (Tract No. 20245) Project
## Upland, California

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of a jurisdictional determination and delineation for the above-referenced project.



**Justin M. Wood, M.S.**
**Senior Biologist**
**Aspen Environmental Group**

**September 2023**

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## Attachments

Attachment 1: Figures
- Figure 1: Project Overview
- Figure 2: Vegetation and Land Cover
- Figure 3: Soils
- Figure 4: Jurisdictional Resources

Attachment 2: Photo Exhibit
Attachment 3. Federal Non-Wetland and Wetland Waters Indicator Information
Attachment 4. Arid West OHWM and Wetland Determination Data Sheets
Attachment 5. Observed Plant Species List and Wetland Indicator Status

# 1.0 Introduction

This report was prepared by Aspen Environmental Group (Aspen) to describe the aquatic resources at the Villa Serena Specific Plan (Tract No. 20245) Project (project). The project is located within 15th Street Basin within the City of Upland, California. The Colonies Partners, LLC. proposes to develop approximately 9.16 acres of the property and construct 65 houses. Throughout this report, "project" refers to the proposed residential development of a portion of 15th Street Basin, while "project site" refers to all areas that may be directly or indirectly impacted by project activities as well as a larger survey area that encompasses 15th Street Basin. This report provides preliminary data on the extent of resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), Santa Ana Regional Water Quality Control Board (SARWQCB), and California Department of Fish and Wildlife (CDFW).

## 1.1 Lead Agency Name and Address

City of Upland, Development Services Department
460 N. Euclid Avenue
Upland, CA 91786

## 1.2 Contact Person and Phone Number

Robert D. Dalquest, AICP, MPA, MURP
Development Services Director
Phone: (909) 931-4148
Email: rdalquest@ci.upland.ca.us

## 1.3 Site Access

Driving directions to the project site are provided below in Table 1.

**Table 1. Driving Directions to the Project Site**

| **From The Greater Los Angeles Area of Southern California:** |
|---|
| Take Interstate 10 east towards San Bernardino. |
| Take exit 51 onto Euclid Ave. north. |
| Travel north of Euclid Ave. approximately 1.8 miles and turn right on E 14th St. |
| Travel east on E 14th St. approximately 1.05 miles and turn left on Alta Ave. |
| Travel north one block on Alta Ave. and make left turn onto E 15th St. |
| Make a quick right turn at a chain link gate to enter the Project site. |

# 2.0 Project and Property Description

## 2.1 Project Description

The Colonies Partners, LLC proposes to construct 65 single-family residential dwellings on 9.16 acres of the existing 20.3-acre 15th Street Basin. In addition to the residential dwellings, the project will also construct a community pool, pool house, restrooms, picnic tables, and utility connections. The total impact area included in this report is 22.1 acres which includes temporary impact areas and additional improvements to infrastructure beyond the limits of 15th Street Basin. Approximately 4.3 acres of 15th

Street Basin will remain as a functioning flood control basin and will be excavated to increase its storage capacity, referred to as the Conservation Area throughout this report. The basin will also be preserved and enhanced to off-set the loss of riparian and wetland vegetation.

## 2.2 Project Location

The project site is approximately 22.1-acres and is located on the northeast corner of the intersection of Fernando Avenue and E. 15th Street in the City of Upland, California (APN: 3105-171-08). The project site is located in Section 23, Township 1 South, Range 5 West (USGS Ontario, CA 7.5-minute quadrangle) (Figure 1, Attachment 1). The project site is surrounded by existing single family residential housing developments to the south, east, and west with Upland Hills Country Club to the north. Dry Dock Depot Boat and RV Storage and Southern California Edison Padua Station are located to the southwest and northwest of Campus Avenue.

# 3.0 Existing Conditions

## 3.1 Topography and Surrounding Land Use

The project site is located within the City of Upland, approximately three miles from the foothills of the San Gabriel Mountains. The project site is located just south of the Upland Hills Country Club and just north of the Red Hill Country Club. Other than the golf courses to the north and south of the project site, the project site is largely surrounded by dense residential development.

## 3.2 Vegetation

Vegetation mapping was done by drawing tentative boundaries onto high-resolution aerial images during site visit on June 24, 2022. These boundaries were then digitized into Geographic Information System (GIS) shapefiles. Vegetation maps were field verified for accuracy on August 15, 2022 (see Attachment 1; Figure 2: Vegetation and Land Cover). Vegetation within the project site is further described below using the names and descriptions in *A Manual of California Vegetation* (Sawyer et al., 2009). Vegetation was mapped digitally using ArcGIS (version 10.7) and one-foot pixel aerial imagery. The smallest mapping unit was approximately 0.05-acre and most mapped vegetation boundaries are accurate to within approximately 5-ft. Any vegetation map is subject to imprecision for several reasons:

1. Vegetation types tend to intergrade on the landscape so that there are no true boundaries in the vegetation itself. In these cases, a mapped boundary represents best professional judgment.
2. Vegetation types as they are named and described tend to intergrade; that is, a given stand of real-world vegetation may not fit into any named type in the classification scheme used. Thus, a mapped and labeled polygon is given the best name available in the classification, but this name does not imply that the vegetation unambiguously matches its mapped name.
3. Vegetation tends to be patchy. Small patches of one named type are often included within mapped polygons of another type. The size of these patches varies, depending on the minimum mapping units and scale of available aerial imagery.

Vegetation within the project site consists of riparian and wetland vegetation, upland vegetation, and other land cover types. They are described in detail below and acreages of the vegetation and land cover areas are presented in Table 1 and shown in Figure 2 (Attachment 1).

**Table 2. Vegetation and Other Cover Types on the Project Site (acres)**

| Vegetation Type | Development Area (Acres) | Conservation Area (Acres) | Project Site (Acres) |
|---|---|---|---|
| California buckwheat scrub | 5.39 | 2.55 | 7.94 |
| Cattail marshes | 0.08 | 0.18 | 0.25 |
| Eucalyptus - tree of heaven - black locust groves | 0.89 | 0.64 | 1.53 |
| Mulefat scrub | -- | 0.17 | 0.17 |
| Scale broom scrub | 0.14 | -- | 0.14 |
| **Other Cover Types** | | | |
| Developed | 11.30 | 0.74 | 12.04 |
| **Total** | **17.79** | **4.29** | **22.08** |

## Riparian and Wetland Vegetation Types

**Cattail marshes (*Typha* (*angustifolia*, *domingensis*, *latifolia*) Herbaceous Alliance).** Cattail marshes are wetland vegetation that is dominated by broadleaf cattail (*Typha latifolia*). Additional species such as marsh purslane (*Ludwigia peploides*), Dallis grass (*Paspalum dilatatum*), cocklebur (*Xanthium strumarium*), and Spanish sunflower (*Pulicaria paludosa*) are also present. Cattail marshes are present in the low-lying portions of the project site that accumulate runoff and storm flows from the adjacent golf course and watershed. Cattail marshes have a State rank of S5 and are therefore not recognized as a sensitive natural community by CDFW (CDFW, 2022).

**Mulefat thickets (*Baccharis salicifolia* Shrubland Alliance).** Mulefat thickets are a winter deciduous shrubland that are dominated by mulefat (*Baccharis salicifolia*). Additional species such as Gooding's black willow (*Salix gooddingii*), Chinese elms (*Ulmus parvifolia*), and California sycamore (*Platanus racemosa*) are also present. The mulefat thickets are present within the Conservation Area, along the northern and southern edges of the basin floor. Mulefat thickets have a State Rank of S4 and are therefore not recognized as a sensitive natural community by CDFW (CDFW, 2022).

## Upland Vegetation Types

**California buckwheat scrub (*Eriogonum fasciculatum* Shrubland Alliance).** California buckwheat scrub is a type of coastal sage scrub dominated by California buckwheat (*Eriogonum fasciculatum*). Other species such as pine bush (*Ericameria pinifolia*), broom baccharis (*Baccharis sarothroides*), coastal sage brush (*Artemisia californica*), and black sage (*Salvia mellifera*). California buckwheat scrub is the most common native vegetation within the project site and most of it is in the Conservation Area. California buckwheat scrub has a State rank of S5 and are therefore not recognized as a sensitive natural community by CDFW (CDFW, 2022).

**Eucalyptus – tree of heaven – black locust groves (*Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance).** Eucalyptus – tree of heaven – black locust groves are used to map all vegetation dominated by non-native trees within the project site including gum trees (*Eucalyptus* spp.), crepe myrtle (*Lagerstroemia indica*), goldenrain tree (*Koelreuteria bipinnata*), and others. Native tree species such as California sycamore and coast live oak are also present but generally represent single trees and not a continuous canopy. Eucalyptus – tree of heaven – black locust groves have a State Rank of SNA (Not Applicable) and are therefore not recognized as a sensitive natural community by CDFW (CDFW, 2022).

**Scale broom scrub (*Lepidospartum squamatum* Shrubland Alliance).** Scale broom scrub is a type of alluvial fan sage scrub or coastal sage scrub dominated by scale broom (*Lepidospartum squamatum*). Other species such as California buckwheat and deerweed (*Acmispon glaber*) are also present in low numbers. Scale broom scrub is present on one slope within the Development Area. It is likely a remnant stand of a vegetation type that was once much more common in the region. Scale broom scrub has a State Rank of S3 and is therefore recognized as a sensitive natural community by CDFW (CDFW, 2022).

### Other Cover Types

**Developed.** This cover type includes disturbed and developed areas within the project site including unpaved roads, drainage structures, and the unvegetated slopes and basin floors. Sparse vegetation is present and includes weedy species such as wild oat (*Avena* spp.), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), mustard (*Hirschfeldia incana*), and tocalote (*Centaurea melitensis*). Developed is not a vegetation type and is therefore not described in *A Manual of California Vegetation* and is also not recognized as a sensitive natural community by CDFW (CDFW, 2022).

## 3.3 Climate

Climate in the region is temperate, with mild winters and hot, dry summers. Average temperatures near the project site in Ontario, California include an average low temperature of 53 degrees Fahrenheit and an average high temperature of 78 degrees Fahrenheit (U.S. Climate Data, 2022). Rainfall is greatest during the months of November through March, with an average annual precipitation total of 17.16 inches, as reported in north Claremont, approximately 4 miles west of the project site (Los Angeles County, 2022). Rainfall to-date has been lower than average with approximately 14.33 inches falling in the region since October 2, 2021 (Los Angeles County, 2022).

## 3.4 Hydrology

Surface flows in the region generally enter Cucamonga Creek, approximately 0.4 miles east of the project site through a series of storm drains and other infrastructure. Surface flows that enter the project site, have largely been disconnected from the rest of the watershed and now originate in the Upland Hills Country Club and surrounding residential developments, within approximately 0.5 miles of the project site. Flows enter the project site through a series of concrete-lined swales and channels that convey flows to the bottom of 15$^{th}$ Street Basin. Most flows that enter the basin appear to percolate into the ground, and very little flows off-site into a storm drain at the west end of the project site. Flows that leave the project site, enter the 15$^{th}$ Street Interceptor and travel west approximately 0.15 miles before they merge with 15th Street Storm Drain. Flows continue downstream approximately 7.3 miles through various channels and basins before entering Cucamonga Creek Channel. Flows then continue downstream, approximately 11 miles before merging with the Santa Ana River within Prado Basin. Approximately 30 miles downstream flows enter the Pacific Ocean which is recognized by the USACE as a traditional navigable water (TNW) thereby establishing surface connectivity of the project site to navigable waters.

The National Hydrography Dataset (NHD) defines nested hydrologic units, beginning with regions that are subdivided into subregions, basins, subbasins and watersheds. The project site is located within the South Coast Hydrologic Region of southern California (CDWR, 2004). It is also located in the Cucamonga Subbasin of the Upper Santa Ana Valley Groundwater Basin (CDWR, 2004). The project site is located within the larger Santa Ana River Watershed, an area of more than 2,400-square-mile (6,200 square kilometer). Elevations in the watershed range from 1,520 feet (463 meter) in the northern portion of the Upland Hills Country Club to 1,425 feet (434 meter) in the western end of the project site. The project site is currently

mapped in the National Wetland Inventory as freshwater emergent wetland habitat (PEM1Cx) and as freshwater pond habitat (PUSCx and PUBFx) (USFWS 2022).

## 3.5 Soils and Geology

### 3.5.1 Soils

Historic soil data from the Natural Resources Conservation Service (NRCS) was used to determine potential soil types, including where hydric soils have historically occurred, within the project site (NRCS, 2022). Figures 3 (Attachment 1) illustrates the location of historic soil types identified in the project site. Detailed information on elevation ranges, parent material, flooding potential, and drainage classes for each map unit symbol is provided below.

**Table 3. Soil Units Occurring in the Project Site (acres)**

| Map Unit Symbol | Map Unit Name | Hydric Soil (Yes or No) | Development Area (Acres) | Conservation Area (Acres) | Project Site (Acres) |
|---|---|---|---|---|---|
| SoC | Soboba gravelly loamy sand, 0 to 9 percent slopes | No | 0.10 | 0.16 | 0.27 |
| SpC | Soboba stony loamy sand, 2 to 9 percent slopes | No | 17.79 | 4.12 | 21.81 |
| | | **Total:** | **17.79** | **4.29** | **22.08** |

**Soboba gravelly loamy sand, 0 to 9 percent slopes.** Soboba gravelly loamy sand soil is found in alluvial fans derived from sandy and gravelly alluvium derived from granite. It is an excessively drained soil. It is found in areas with 0 to 9 percent slopes at elevations of about 30 to 4,200 feet. Water table depth is typically more than 80 inches, and these areas never flood. The substrate is comprised of gravelly loamy sand (0 to 10 inches), very gravelly loamy sand (12 to 36 inches), and very stony sand (36 to 60 inches).

**Soboba stony loamy sand, 2 to 9 percent slopes.** Soboba stony loamy sand soil is found in alluvial fans derived from granite. It is an excessively drained soil. It is found in areas with 2 to 9 percent slopes at elevations of about 960 to 3,690 feet. Water table depth is typically more than 80 inches, and these areas never flood. The substrate is comprised of stony loamy sand (0 to 10 inches), very stony loamy sand (10 to 24 inches), and very stony sand (24 to 60 inches).

### 3.5.2 Geology

The project site is located on an extensive alluvial fan below the San Gabriel Mountains, formed by Cucamonga Creek over millions of years. The quaternary age alluvium consists of unconsolidated to loosely consolidated sand, gravel, and silt with a few beds of compacted clay deposit by streams draining the San Gabriel Mountains. The gravels of alluvial fans are relatively coarse throughout (CDWR, 2004). Several faults are present in the vicinity of the project site, including the Cucamonga Fault, the Red Hill-Etiwanda Avenue Fault, and the Indian Hill Fault (CDWR, 2004).

# 4.0 Regulatory Background

Jurisdictional waters, including some wetlands and riparian habitats, are regulated by the USACE, the Regional Water Quality Control Board (RWQCB), and CDFW. The USACE Regulatory Program regulates activities pursuant to Section 404 of the federal Clean Water Act (33 U.S.C. 1344; CWA); the CDFW

regulates activities under the Fish and Game Code Section 1600-1607; and the RWQCB regulates activities under Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

## 4.1 Section 404 of the Clean Water Act

Section 404 of the CWA regulates the discharge of dredged material, placement of fill material, or certain types of excavation within "waters of the U.S." (resulting in more than incidental fallback of material) and authorizes the Secretary of the Army, through the Chief of Engineers, to issue permits for such actions. Permits can be issued for individual projects (individual permits) or for general categories of projects (general permits). The definition of federally jurisdictional wetlands and "waters of the U.S." have changed several times recently and the latest interpretation of the CWA is discussed below.

In 2020, the U.S. Environmental Protection Agency (USEPA) updated the CWA and their definition of navigable waters (USACE and USEPA, 2020). The Navigable Waters Protection Rule (NWPR) revised the definition of "Waters of the U.S." to encompass traditional navigable waters; perennial and intermittent tributaries that contribute surface waters flow to such waters; certain lakes, ponds, and impoundments of jurisdictional waters; and wetlands adjacent to other jurisdictional waters. Ephemeral waters were not included in the NWPR definition of "Waters of the U.S." In 2021, the USEPA and USACE were directed by the Biden Administration and the U.S. District Court to vacate the 2020 NWPR and revert to the pre-2020 rule. On January 18, 2023, the USEPA published the "Revised Definition of 'Waters of the United States'" (the January 2023 Rule), with a definition of "Waters of the U.S" that reutilized the 2006 *Rapanos* ruling's permanent and significant nexus standards.

Most recently on May 25, 2023, the U.S. Supreme Court decision in *Sackett v. Environmental Protection Agency* concluded that the significant nexus standard is inconsistent with the CWA. On August 29, 2023, the USACE and USEPA issued a prepublication of the final rule to amend the January 2023 Rule and define "Waters of the U.S." as follows, once again not including ephemeral waters:

- Traditional navigable waters, the territorial seas, and interstate waters (referred to as "(a)(1) waters").
- Impoundments of "Waters of the U.S.", other than impoundments of waters identified under paragraph (a)(5) (referred to as "(a)(2) waters").
- Tributaries to traditional navigable waters, the territorial seas, and interstate waters that are relatively permanent, standing or continuously flowing bodies of water (referred to as "(a)(3) waters" or "jurisdictional tributaries").
- Wetlands adjacent to and having a continuous surface connection with (a)(1) waters or relatively permanent, standing or continuously flowing (a)(2) waters (referred to as "jurisdictional adjacent wetlands").
- Intrastate lakes and ponds not identified as (a)(1) through (4) waters that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to (a)(1) or (a)(3) waters.

The January 2023 Rule exclusions from the definition of "Waters of the U.S." remain the same, including, but not limited to, prior converted cropland and ditches excavated wholly in and draining only dry land not carrying a relatively permanent flow of water.

On April 6, 2022, the U.S. Supreme Court issued a stay of the 2021 order by the U.S. District Court for the Northern District of California that vacated the USEPA's 2020 Clean Water Act Section 401 Certification Rule. Therefore, the CWA section 401 certification process is once again governed by the CWA section 401 certification regulations promulgated by USEPA in 2020 (40 CFR 121). On June 1, 2022, the USEPA Administrator signed a proposed rule to improve the CWA section 401 certification process. The proposed rule would replace and update the existing regulations at 40 CFR 121, to be more consistent with the statutory text of the 1972 CWA and clarify elements of section 401 certification practice that has evolved over the 50 years since the 1971 regulation was promulgated. On June 9, 2022, the proposed rule was published in the Federal Register (EPA, 2022).

## 4.2 Porter Cologne Water Quality Control Act and Section 401 of the Clean Water Act

The RWQCBs regulate activities affecting 'waters of the State' according to the Porter-Cologne Water Quality Control Act and Section 401 of the federal CWA. The Porter-Cologne Act defines waters of the State as all surface and subsurface waters. The RWQCBs may issue permits (called Waste Discharge Requirements or WDRs) or may issue a waiver for a given application. In addition, the RWQCB recently started to implement a new regulatory program for all waters of the State.

On April 2, 2019, the State Water Resources Control Board (SWRCB) adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. The adopted definitions and procedure allow for the presence of hydric substrates as a criterion for wetland identification (not just wetland soils) and wetland hydrology for an area devoid of vegetation (less than 5% cover) to be considered a wetland. Waters of the State are typically delineated based on the ordinary high-water mark (OHWM) in the field as defined by federal guidelines (SWRCB, 2022; see also USACE, 2008) as the limits of jurisdiction. However, waters of the State include isolated waters and need not have downstream surface connection to federally jurisdictional waters. The new program uses the soils, hydrology, and vegetation criteria to identify wetlands, but may define certain unvegetated sites (e.g., mud flats or playas) as wetlands based on only the soils and hydrology criteria. The definition of "waters of the State" excludes certain types of artificial wetlands greater than or equal to one acre in size, including, but not limited to, those constructed and currently used and maintained for "detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program" (SWRCB, 2022). The project site is within the jurisdictional boundaries of the Santa Ana RWQCB.

Section 401 of the CWA requires that:

> *…any applicant for a Federal permit for activities that involve a discharge to "waters of the State," shall provide the Federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge will comply with the applicable provisions under the Federal Clean Water Act.*

Therefore, before the USACE may issue a Section 404 permit, a permittee must apply for and receive a Section 401 Water Quality Certification from the RQWCB, Santa Ana Region. The RWQCB may add conditions to their certification to remove or mitigate potential impacts to water quality standards.

## 4.3 Section 1602 of the California Fish and Game Code

Section 1602 of the California Fish and Game Code requires any person, State or local governmental agency, or public utility which proposes a project that will substantially divert or obstruct the natural flow

or substantially change the bed, channel, or bank of any river, stream, or lake, or use materials from a streambed, or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake, to first notify the CDFW of the proposed project. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. Based on the notification materials submitted, the CDFW will determine if the proposed project may impact fish or wildlife resources.

If the CDFW determines that a proposed project may substantially adversely affect existing fish or wildlife resources, a Lake or Streambed Alteration Agreement (SAA) will be required. A completed California Environmental Quality Act (CEQA) document must be submitted to CDFW before a SAA will be issued.

# 5.0 Waters and Wetlands Delineation Methodology

The assessment of jurisdictional wetlands, waters of the United States (U.S.), waters of the State, and other jurisdictional habitats was conducted by Aspen biologists Justin Wood and Jacob Aragon on June 24 and August 15, 2022. Prior to conducting the field assessment Wood reviewed current and historic aerial photographs, the San Bernardino County Soil Survey (NRCS, 2022), and the local and state hydric soil list (NRCS, 2022) to evaluate the potential active channels and wetland features in the project site. Wood also reviewed the National Wetland Inventory (USFWS, 2022) and the 2016 wetland plant ratings in the National Wetland Plant List (Lichvar et al., 2016).

Site maps were generated with available aerial photographs and potentially jurisdictional features were identified and marked with lines and global positioning system (GPS) coordinates to assist in field verification. During the field assessment, vegetation and hydrology were mapped using an Arrow GPS unit and identified on aerial photographs (Figure 4, Attachment 1). Field maps were digitized using Global Information System (GIS) and total state and federal jurisdictional areas were calculated. Representative site photos were captured during the survey and are included in this report (see Attachment 2).

## 5.1 Wetland Waters of the U.S.

Federal wetlands, where present, were delineated using the USACE Wetland Delineation Manual (1987) and the Arid West Supplement (2008) based on three wetland parameters: hydrophytic vegetation, wetland hydrology, and hydric soils (USACE, 1987, 2008). The project site had very few locations that had a potential to support federal wetlands, therefore the biologists did not sample along transects but instead focused on the four drainage features directly. In addition, an assessment of downstream connectivity was also completed to determine if features within the project site connect with downstream TNW.

## 5.2 Non-wetland Waters of the U.S.

Jurisdictional non-wetland waters of the U.S. were delineated based on the limits of the ordinary high-water mark (OHWM), where present, as determined by changes in physical and biological features, such as bank erosion, deposited vegetation or debris, and vegetative characteristics. In the Arid West region, the Ordinary High-Water Mark (OHWM) indicates the limits of high flows in low- to moderate-discharge events (USACE, 2008). See Tables 1-1 and 1-2 in Attachment 3 (Federal Non-Wetland and Wetland Waters Indicator Information Potential Geomorphic and Vegetative Indicators of Ordinary High-Water Marks for

the Arid West) for a list of key physical features used for determining the OHWM identified by the arid west manual. OHWM datasheets were completed at two locations within the project site, using the methods described in Curtis and Lichvar (2010).

## 5.3 RWQCB Waters of the State

RWQCB waters of the state generally match the limits of the waters of the U.S. described above. The RWQCB waters of the state are generally delineated based on the limits of the OHWM as determined by changes in physical and biological features, such as bank erosion, deposited vegetation or debris, and vegetative characteristics. If waters of the U.S. are not present, the RWQCB may exert jurisdiction that matches the jurisdiction of CDFW, under Porter Cologne Water Quality Control Act. The Santa Ana RWQCB (SARWQCB) is the state agency responsible for regulating waters of the State throughout the project site. In addition, the RWQCB can take jurisdiction over wetlands of the State if the area has hydric substrates and wetland hydrology present, as described above for Wetlands Waters of the U.S.

## 5.4 CDFW Jurisdictional Waters

CDFW jurisdiction was delineated to the tops of the channel banks or to the edge of the adjacent riparian vegetation, where present. CDFW jurisdictional streambeds were mapped to the top of the banks which was adjacent to upland vegetation throughout much of the project site. CDFW has jurisdiction over a larger area than the federal jurisdiction, therefore the total acreage of CDFW jurisdictional streambeds includes all federally jurisdictional waters of the U.S., where present, as well as additional adjacent state jurisdictional streambeds and vegetation.

# 6.0 Results

One category of jurisdictional feature was documented within the project site: CDFW jurisdictional streambeds (refer to Figure 4, Attachment 1). All four of the drainage features are not expected to fall under the jurisdiction of the USACE because drainage 1 experiences ephemeral flows and drainages 2, 3, and 4 largely lack downstream connectivity with TNW. None of the four human-made drainage features are expected to fall under the jurisdiction of the SARWQCB either due to their being located wholly within a human-made artificial stormwater management basin permitted by the Area-wide Urban Storm Water Runoff Management Program issued by the SARWQCB (SARWQCB, 2010). Table 4 and Figure 4 (Attachment 1) show locations and acreages of CDFW jurisdictional features within the project site. Attachment 4 also contains the Wetland Determination Data Forms for the Arid West Region and the Arid West Ephemeral and Intermittent Streams OHWM Datasheets that were completed during the assessment. Attachment 5 includes all plants observed on the project site and includes their wetland indicator status.

**Table 4. Jurisdictional Waters and Wetlands within the Project Site**

| | USACE Waters of the U.S. | | SARWQCB Waters of the State | | | | | |
|---|---|---|---|---|---|---|---|---|
| Drainage Number | Area (acres) | Length (ft.) | Area (acres) | Length (ft.) | Data Sheet Number | Cowardin Classification[1] | Dominant Vegetation[1] | CDFW Jurisdictional Streambeds (acres) |
| 1 | -- | -- | -- | -- | Wetland 1 & OHWM 1 | R4SB | Cattail marsh | 0.08 |
| 2 | -- | -- | -- | -- | N/A | R4SB | Cattail marsh | 0.02 |
| 3 | -- | -- | -- | -- | N/A | R4SB | Cattail marsh | 1.32 |

**Table 4. Jurisdictional Waters and Wetlands within the Project Site**

| Drainage Number | USACE Waters of the U.S. Area (acres) | USACE Waters of the U.S. Length (ft.) | SARWQCB Waters of the State Area (acres) | SARWQCB Waters of the State Length (ft.) | Data Sheet Number | Cowardin Classification[1] | Dominant Vegetation[1] | CDFW Jurisdictional Streambeds (acres) |
|---|---|---|---|---|---|---|---|---|
| 4 | -- | -- | -- | -- | N/A | R4SB | Cattail marsh | 1.48 |
| Total | -- | -- | -- | -- | **--** | **--** | **--** | **2.90** |

**Note:**
[1] = The dominant Cowardin Classification and vegetation type was used for each drainage.

- **Drainage 1** – Drainage 1 is a small, isolated human-made drainage feature located at the west end of the project site near a storm drain intake. Drainage 1 was mapped as a CDFW Streambed. Drainage 1 is mapped as cattail marsh and is dominated by species such as castor bean (*Ricinus communis*), jungle grass (*Echinochloa colona*), umbrella sedge (*Cyperus involucratus*), and Dallis grass. At the time of the survey, drainage 1 was completely dry but did have a defined OHWM. Although drainage 1 has downstream connectivity to TNW, it was not mapped as USACE waters of the U.S. as it appears to ephemerally convey collected stormwater sheet flow from the immediately adjacent uplands during storm events. It also does not appear to receive flows from the remainder of the project site to the east. Drainage 1 is mapped as freshwater emergent wetland (PEM1Cx) in the National Wetland Inventory (USFWS, 2022).

- **Drainage 2** – Drainage 2 is small, incised isolated human-made drainage feature located just east of drainage 1. Drainage 2 was mapped as a CDFW Streambed. Drainage 2 is mapped as cattail marsh and is dominated by species such as marsh purslane, Spanish sunflower, and willow-herb (*Epilobium ciliatum*). It receives flows from a concrete-lined swale to the north of the drainage that receives runoff from the adjacent golf course. At the time of the survey, drainage 2 had no surface water present but the soil was wet. The drainage was approximately two feet lower the surrounding basin floor, creating an OHWM, however flows do not appear to fill drainage 2 to the point of allowing surface connectivity with drainage 1 to the west. Drainage 2 is mapped as freshwater emergent wetland (PEM1Cx) in the National Wetland Inventory (USFWS, 2022).

- **Drainage 3** – Drainage 3 is larger isolated drainage feature located near the center of the project site. Drainage 3 was also mapped as a CDFW Streambed. Drainage 3 is largely mapped as cattail marsh and is dominated by species such as broadleaf cattail (*Typha latifolia*), water speedwell (*Veronica anagallis-aquatica*), common plantain (*Plantago major*), and annual sunflower (*Helianthus annuus*). It receives flows from two concrete-lined swales to the north that receives runoff from the adjacent golf course. At the time of the survey, drainage 3 had no surface water present but the soil was wet. An earthen berm that is present in the basin floor, prevents flows from drainage 3 to flow west towards drainages 1 and 2. Drainage 3 is primarily mapped as freshwater emergent wetland (PEM1Cx) in the National Wetland Inventory (USFWS, 2022).

- **Drainage 4** – Drainage 4 is larger isolated drainage feature located at the east end of the project site. Drainage 4 was also mapped as a CDFW Streambed. Drainage 4 is largely mapped as cattail marsh and is dominated by species such as broadleaf cattail, water speedwell, spearmint (*Mentha spicata*), and annual sunflower. It receives flows from three concrete-lined swales, one to the northeast, one to the southeast, and one to the north. These swales all convey runoff from the surrounding golf courses and residential development. At the time of the survey, drainage 4 had no surface water present but the soil was wet. High ground in the basin floor, prevents flows from

drainage 4 to flow west towards drainages 1, 2, and 3. Drainage 4 is primarily mapped as freshwater emergent wetland (PEM1Cx) in the National Wetland Inventory (USFWS, 2022).

## 6.1 Wetland Waters of the U.S.

Based on the field assessment, including the wetland sample locations, no federal wetlands were determined to be present within the project site (see Figure 4, Attachment 1). This was based on a lack of any field indicators. The Wetland Determination Data Forms for the Arid West Region are included in Attachment 4.

## 6.2 Non-wetland Waters of the U.S.

Based on this assessment of OHWMs and Aspen's professional opinion, no Waters of the U.S. were determined to be present within the project site (see Figure 4, Attachment 1). This was based on the ephemeral nature of drainage 1 and the lack of downstream connectivity to TNW. The Arid West Ephemeral and Intermittent Streams OHWM Datasheets are included in Attachment 4.

## 6.3 RWQCB Waters of the State

Based on the field assessment and Aspen's professional opinion, no waters of the State were determined to be present within the project site (see Table 4 and Figure 4 of Attachment 1). This was based on the locations of each drainage being wholly within the permitted stormwater management basin. No wetlands of the State were identified within the project site.

## 6.4 CDFW Jurisdictional Waters

Based on this assessment and Aspen's professional opinion, approximately 2.90 acres within the project site meet the definition of CDFW jurisdictional streambeds and adjacent jurisdictional vegetation (see Table 4 and Figure 4 of Attachment 1). This includes drainages 1, 2, 3, and 4 as discussed above. This conclusion is primarily based on the presence of bed and bank and riparian vegetation. Of the 2.90 acres of CDFW jurisdictional streambeds, 1.44 acres are within the development area and will be impacted by the project while the remaining 1.47 acres are within the conservation area.

# 7.0 Summary and Conclusions

The project site includes approximately 2.90 acres of CDFW jurisdictional streambeds and adjacent jurisdictional vegetation were mapped based on the presence of clearly defined bed and banks and field observations.

The conclusions presented above represent Aspen's professional opinion based on our knowledge and experience with the USACE, SARWQCB, and CDFW, including the applicable regulatory guidance documents and manuals. However, the USACE, SARWQCB, and CDFW have final authority in determining the status and presence of jurisdictional wetlands and waters and the extent of their boundaries.

# 8.0. Literature Cited

CDFW (California Department of Fish and Wildlife). 2022. California Natural Community List. CDFW. Sacramento. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline

CDWR (California Department of Water Resources). 2004. California's Groundwater (Bulletin 118). [online]: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/8_002_02_CucamongaSubbasin.pdf. Accessed September 2022.

Curtis, K.E. and R.W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory. http://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/Jurisdiction/OHWMAridWestDatasheet.pdf.

EPA (US Environmental Protection Agency). 2022. Clean Water Act Section 401 Water Quality Certification Improvement Rule; Proposed Rule. Federal Register 87:35318-35381 (June 9).

Los Angeles County (Los Angeles County Public Works). 2022. Near Real-Time Precipitation Map. https://dpw.lacounty.gov/wrd/rainfall/ Accessed September 2022.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1–17. Published 28 April 2016. ISSN 2153 733X

Natural Resource Conservation Service (NRCS). 2022. Web Soil Survey 2.0. [online]: http://websoilsurvey.nrcs.usda.gov/ Accessed September 2022.

RCA Associates, Inc. 2022. General Biological Resources Assessment, Upland, San Bernardino County, California, APN: 3105-171-08.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. Manual of California Vegetation, 2nd ed. California Native Plant Society, Sacramento, California. 1300 pp.

SARWQCB (Santa Ana Regional Water Quality Control Board). 2010. National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for the San Bernardino County Flood Control District, the County of San Bernardino, and the Incorporated Cities of San Bernadino County within the Santa Ana Region. Area-Wide Urban Storm Water Runoff Management Program. Order No. R8-2010-0036; NPDES No. CAS618036. January 29, 2010.

SWRCB (State Water Resources Control Board). 2022. State Water Resources Control Board Resolution No. 2021-0012. Accessed September 2022. https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp/rs2021_0012.pdf.

U.S. Army Corps of Engineers (USACE). 1987. U.S. Army Cops Wetland Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.

_____. 2008. Regional Supplement to the U.S Army Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE and USEPA. (US Environmental Protection Agency). 2020. The Navigable Waters Protection Rule: Definition of "Waters of the United States." Federal Register 85:22250-22342 (22 Jun).

_____. 2023. Amendments to the "Revised Definition of 'Waters of the United States.'" Final rule, prepublication copy issued August 29, 2023, pending publication in Federal Register.

U.S. Climate Data, 2022. U.S. Climate Data Website. https://www.usclimatedata.com/climate/ontario/california/united-states/usca2487 Accessed September 2022.

U.S. Fish and Wildlife Service (USFWS). 2022. National Wetland Inventory. [Online]: https://www.fws.gov/wetlands/data/Mapper.html Accessed September 2022.

# Attachment 1 – Figures

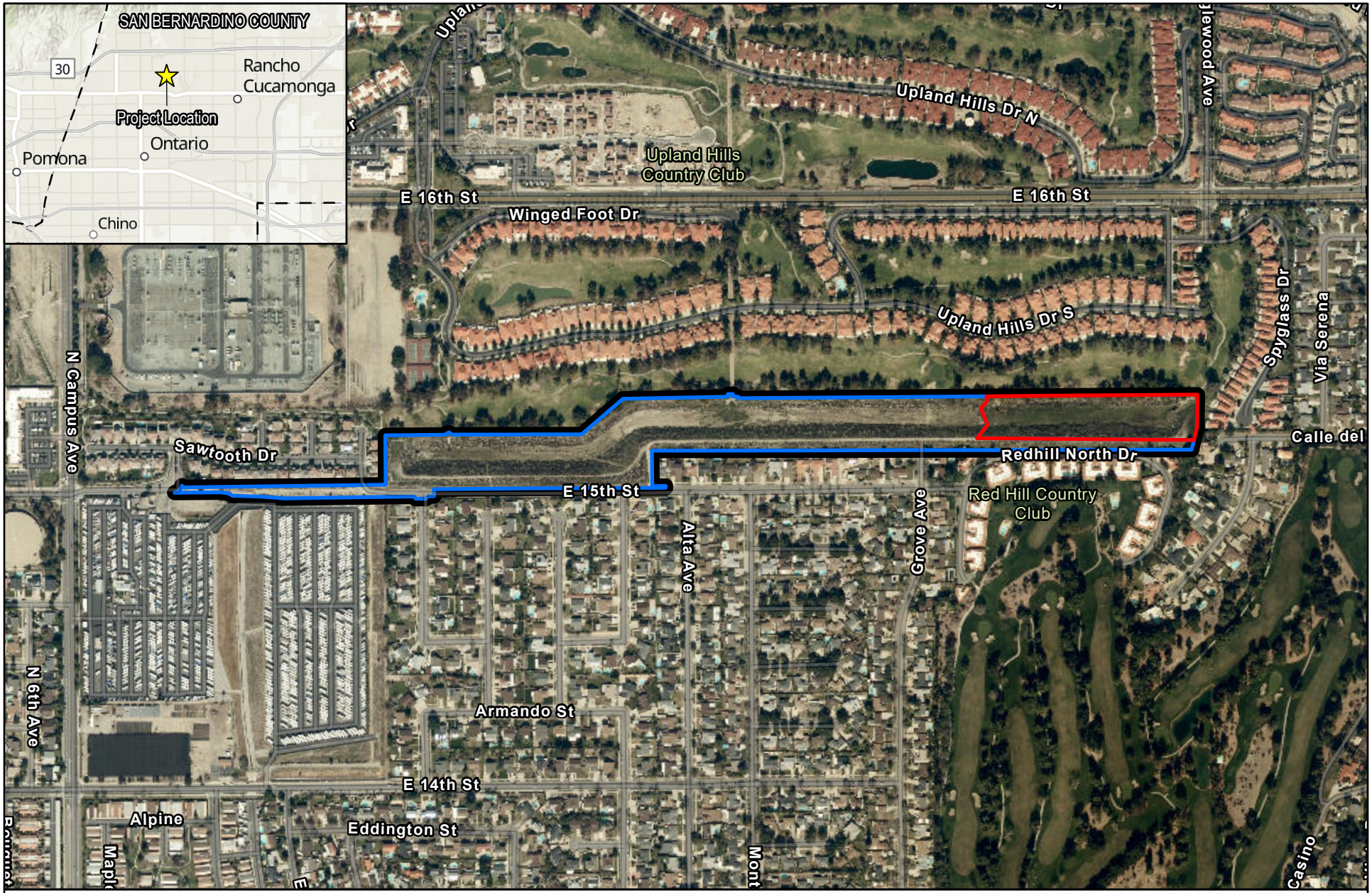



**Figure 1**

**Project Overview**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

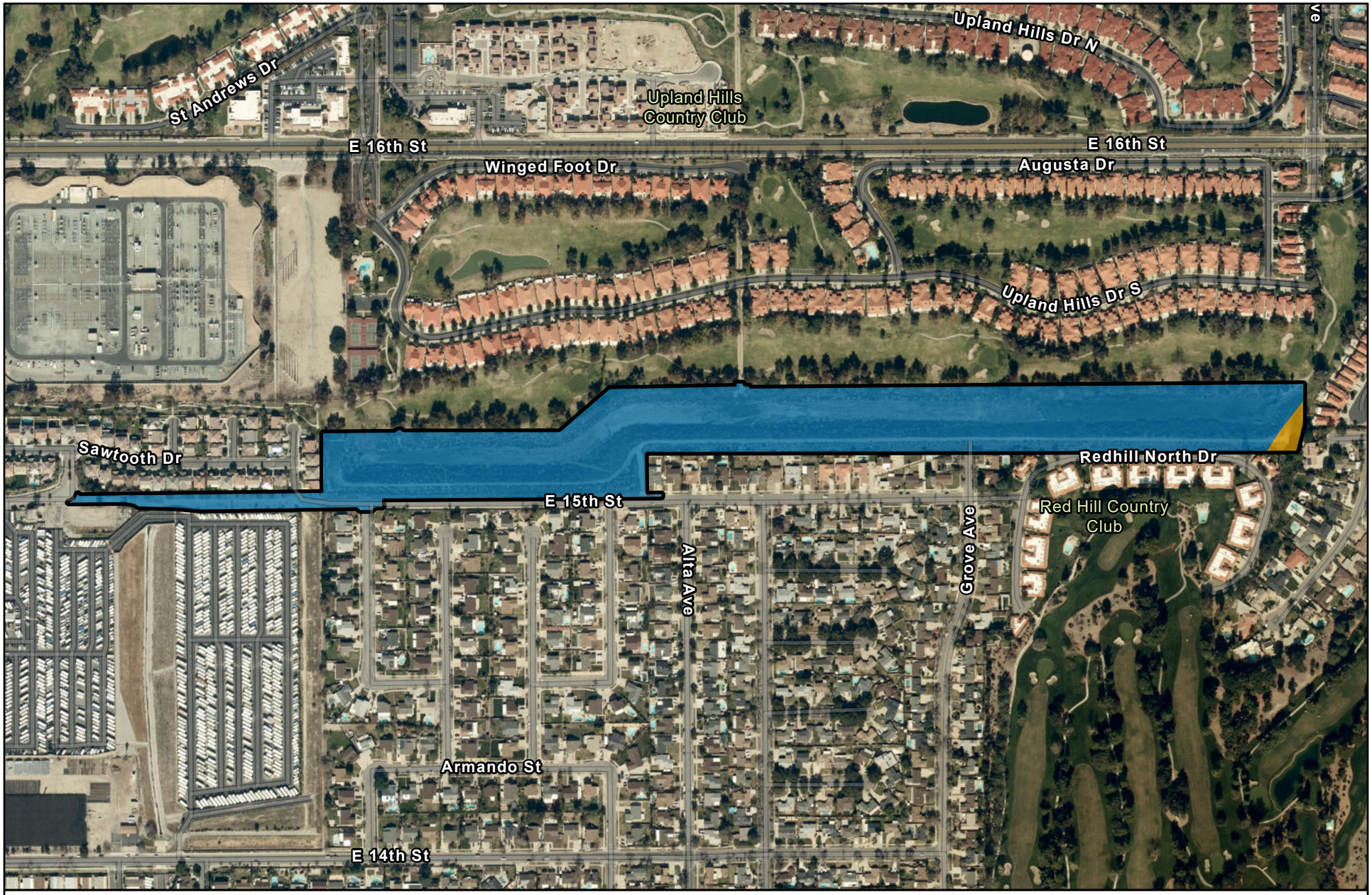



**Figure 2**

**Soils**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; NRCS, 2022; The Colonies Partners, LP, 2022.

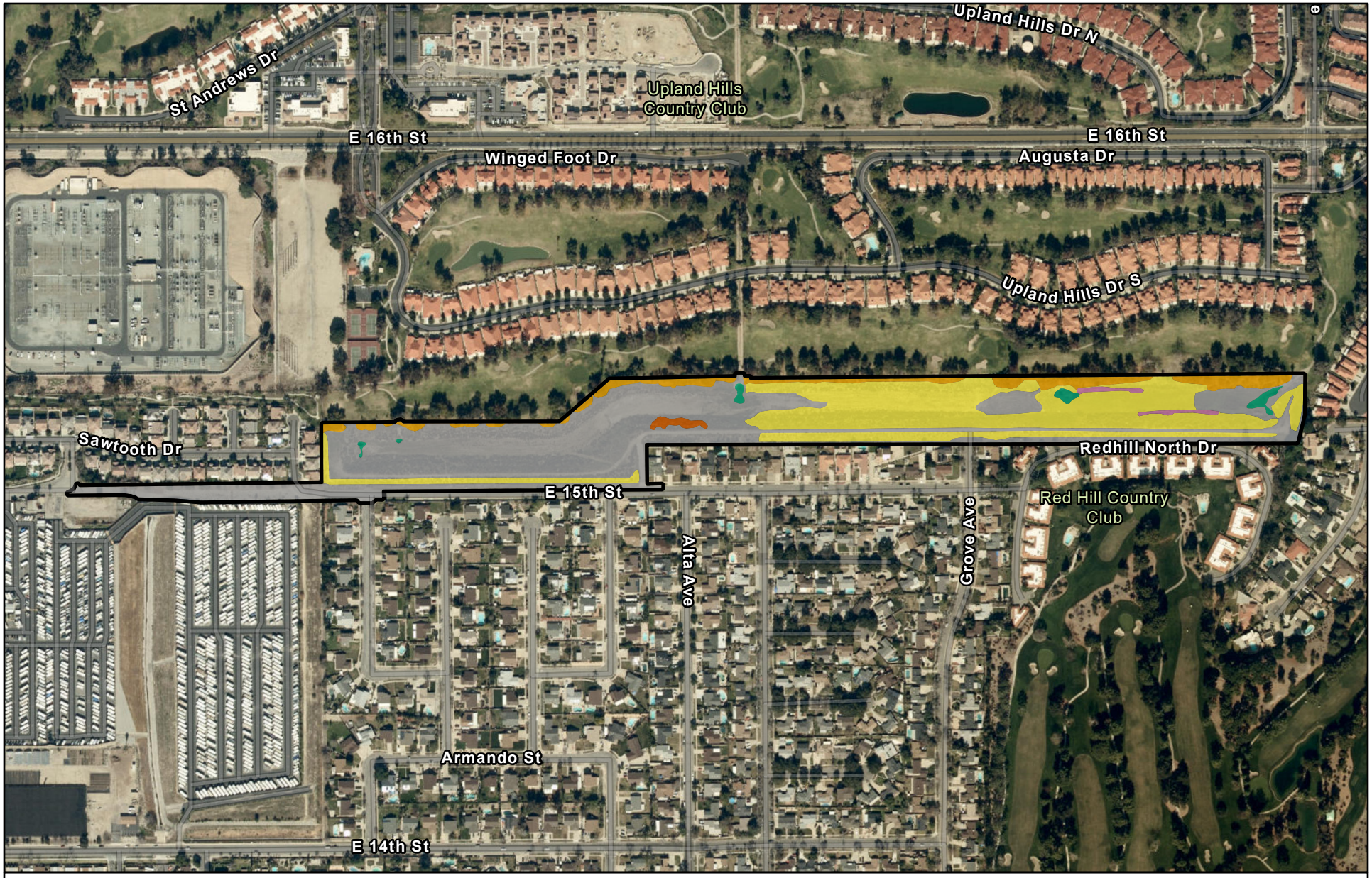



**Figure 3**

**Vegetation and Land Cover**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

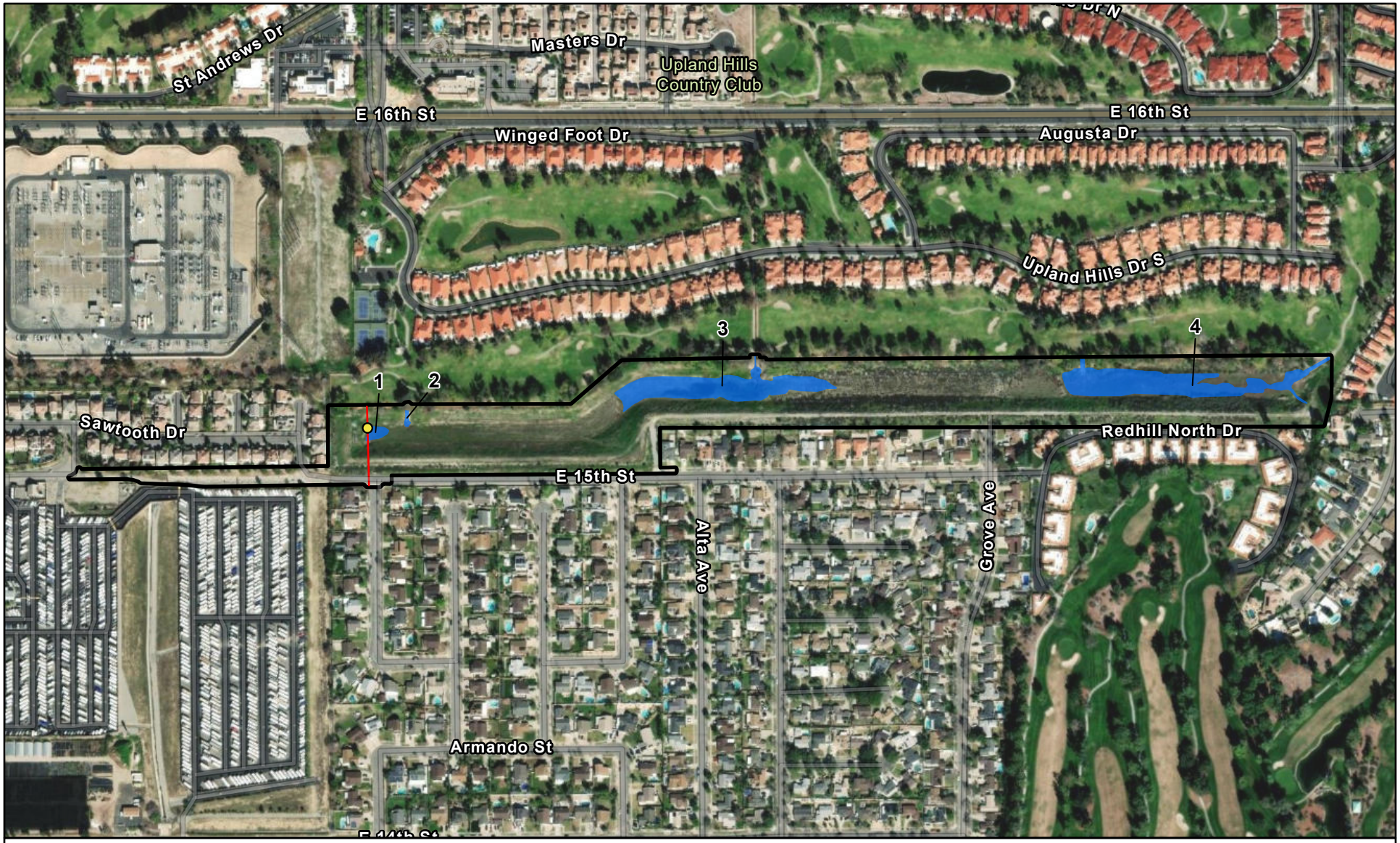



**Figure 4**

**Jurisdictional Resources**

Sources: Aspen, 2022; County of San Bernardino, 2022; Esri, 2022; The Colonies Partners, LP, 2022.

## Attachment 2 – Photo Exhibit



Photo 1: East-facing view of Drainage 1 and wetland vegetation within the Development Area.



Photo 2: South-facing view of Drainage 1 near the storm drain inlets within the Development Area.



Photo 3: North-facing view of Drainage 2 within the Development Area.



Photo 4: Northwest-facing overview of the Development Area showing Drainages 1 and 2, in the western portion of the Project Site.



Photo 5: Close-up view of dense cattail marshes within Drainage 3, within the Development Area.



Photo 6: Northeast-facing overview of cattail marshes in Drainage 3, within the Development Area.



Photo 7: Northeast-facing overview of cattail marshes at one of the side drainages within the Conservation Area.



Photo 8: Close-up view of wetland vegetation in Drainage 3 within the Conservation Area.

# Attachment 3 – Federal Non-Wetland and Wetland Waters Indicator Information

**Table 1. Potential Geomorphic Indicators of Ordinary High-Water Marks for the Arid West**

| (A) Below OHW | (B) At OHW | (C) Above OHW |
|---|---|---|
| 1. In-stream dunes | 1. Valley flat | 1. Desert pavement |
| 2. Crested ripples | 2. Active floodplain | 2. Rock varnish |
| 3. Flaser bedding | 3. Benches: low, mid, most prominent | 3. Clast weathering |
| 4. Harrow marks | 4. Highest surface of channel bars | 4. Salt splitting |
| 5. Gravel sheets to rippled sands | 5. Top of point bars | 5. Carbonate etching |
| 6. Meander bars | 6. Break in bank slope | 6. Depositional topography |
| 7. Sand tongues | 7. Upper limit of sand-sized particles | 7. Caliche rubble |
| 8. Muddy point bars | 8. Change in particle size distribution | 8. Soil development |
| 9. Long gravel bars | 9. Staining of rocks | 9. Surface color/tone |
| 10. Cobble bars behind obstructions | 10. Exposed root hairs below intact soil layer | 10. Drainage development |
| 11. Scour holes downstream of obstructions | 11. Silt deposits | 11. Surface relief |
| 12. Obstacle marks | 12. Litter (organic debris, small twigs and leaves) | 12. Surface rounding |
| 13. Stepped-bed morphology in gravel | 13. Drift (organic debris, larger than twigs) | |
| 14. Narrow berms and levees | | |
| 15. Streaming lineations | | |
| 16. Desiccation/mud cracks | | |
| 17. Armored mud balls | | |
| 18. Knick Points | | |

**Table 2. Potential Vegetation Indicators of Ordinary High-Water Marks for the Arid West**

| | (D) Below OHW | (E) At OHW | (F) Above OHW |
|---|---|---|---|
| Hydroriparian indicators | 1. Herbaceous marsh species<br>2. Pioneer tree seedlings<br>3. Sparse, low vegetation<br>4. Annual herbs, hydromesic ruderals<br>5. Perennial herbs, hydromesic clonals | 1. Annual herbs, hydromesic ruderals<br>2. Perennial herbs, hydromesic clonals<br>3. Pioneer tree seedlings<br>4. Pioneer tree saplings | 1. Annual herbs, xeric ruderals<br>2. Perennial herbs, non-clonal<br>3. Perennial herbs, clonal and non-clonal co-dominant<br>4. Mature pioneer trees, no young trees<br>5. Mature pioneer trees w/upland species<br>6. Late-successional species |
| Mesoriparian Indicators | 6. Pioneer tree seedlings<br>7. Sparse, low vegetation<br>8. Pioneer tree saplings<br>9. Xeroriparian species | 5. Sparse, low vegetation annual herbs, hydromesic<br>6. ruderals<br>7. Perennial herbs, hydromesic clonals<br>8. Pioneer tree seedlings<br>9. Pioneer tree saplings<br>10. Xeroriparian species<br>11. Annual herbs, xeric ruderals | 7. Xeroriparian species<br>8. Annual herbs, xeric ruderals<br>9. Perennial herbs, non-clonal<br>10. Perennial herbs, clonal and non-clonal codominant<br>11. Mature pioneer trees, no young trees<br>12. Mature pioneer trees, xeric understory<br>13. Mature pioneer trees w/upland species<br>14. Late-successional species<br>15. Upland species |
| Xeroriparian indicators | 10. Sparse, low vegetation<br>11. Xeroriparian species<br>12. Annual herbs, xeric ruderals | 12. Sparse, low vegetation<br>13. Xeroriparian species<br>14. Annual herbs, xeric ruderals | 16. Annual herbs, xeric ruderals<br>17. Mature pioneer trees w/upland species<br>18. Upland species |

## Table 3. Summary of Wetland Indicator Status

| Category | | Probability |
|---|---|---|
| Obligate Wetland | OBL | Almost always occur in wetlands (estimated probability >99%) |
| Facultative Wetland | FACW | Usually occur in wetlands (estimated probability of 67–99%) |
| Facultative | FAC | Equally likely to occur in wetlands/non-wetlands (estimated probability of 34–66%) |
| Facultative Upland | FACU | Usually occur in non-wetlands (estimated probability 67–99%) |
| Obligate Upland | UPL | Almost always occur in non-wetlands (estimated probability >99%) |
| Non-Indicator | NI | No indicator status has been assigned |

Source: Reed, 1988

## Table 4. Wetland Hydrology Indicators*

| Primary Indicators | Secondary Indicators |
|---|---|
| Watermarks | Oxidized Rhizospheres Associated with Living Roots |
| Water-Borne Sediment Deposits | FAC-Neutral Test |
| Drift Lines | Water-Stained Leaves |
| Drainage Patterns Within Wetlands | Local Soil Survey Data |

*Table adapted from 1987 USACE Manual and Related Guidance Documents.

## Table 5. Wetland Hydrology Indicators for the Arid West*

| | Primary Indicator (any one indicator is sufficient to determine that wetland hydrology is present) | Secondary Indicator (two or more indicators are required to determine that wetland hydrology is present) |
|---|---|---|
| **Group A – Observation of Surface Water or Saturated Soils** | | |
| A1 – Surface Water | X | |
| A2 – High Water Table | X | |
| A3 – Saturation | X | |
| **Group B – Evidence of Recent Inundation** | | |
| B1 – Water Marks | **X** (Non-riverine) | **X** (Riverine) |
| B2 – Sediment Deposits | **X** (Non-riverine) | **X** (Riverine) |
| B3 – Drift Deposits | **X** (Non-riverine) | **X** (Riverine) |
| B6 – Surface Soil Cracks | X | |
| B7 – Inundation Visible on Aerial Imagery | X | |
| B9 –Water-Stained Leaves | X | |
| B10 – Drainage | X | X |
| B11 – Salt Crust | X | |
| B12 – Biotic Crust | X | |
| B13 – Aquatic Invertebrates | X | |
| **Group C – Evidence of Current or Recent Soil Saturation** | | |
| C1 – Hydrogen Sulfide Odor | X | |
| C2 – Dry-Season Water Table | | X |
| C3 – Oxidized Rhizospheres along Living Roots | X | |
| C4 – Presence of Reduced Iron | X | |
| C6 – Recent Iron Reduction in Tilled Soils | X | |

## Table 5. Wetland Hydrology Indicators for the Arid West*

| | Primary Indicator (any one indicator is sufficient to determine that wetland hydrology is present) | Secondary Indicator (two or more indicators are required to determine that wetland hydrology is present) |
|---|---|---|
| C7 – Thin Muck Surface | X | |
| C8 – Crayfish Burrows | | X |
| C9 – Saturation Visible on Aerial Imagery | | X |
| Group D – Evidence from other Site Conditions or Data | | |
| D3 – Shallow Aquitard | | X |
| D5 – FAC-Neutral Test | | X |

*Table adapted from Regional Supplement to the USACE of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0.

## Table 6. Field Indicators of Hydric Soil Conditions*

| 1. Indicators of Historical Hydric Soil Conditions | 2. Indicators of Current Hydric Soil Conditions |
|---|---|
| a. Histosols<br>b. Histic epipedons;<br>c. Soil colors (e.g., gleyed or low-chroma colors, soils with bright mottles (Redoximorphic features) and/or depleted soil matrix<br>d. High organic content in surface of sandy soils<br>e. Organic streaking in sandy soils<br>f. Iron and manganese concretions<br>g. Soil listed on county hydric soils list | a. Aquic or peraquic moisture regime (inundation and/or soil saturation for *7 continuous days)<br>b. Reducing soil conditions (inundation and/or soil saturation for *7 continuous days)<br>c. Sulfidic material (rotten egg smell) |

*Table adapted from 1987 USACE Manual and Related Guidance Documents.

## Table 7. Hydric Soil Indicators for the Arid West*

| Hydric Soil Indicators | | | Hydric Soil Indicators for Problem Soils** |
|---|---|---|---|
| All Soils | Sandy Soils | Loamy and Clay Soils | |
| A1 – Histosol | S1 – Sandy Mucky Mineral | F1 – Loamy Mucky Mineral | A9 – 1 cm Muck |
| A2 – Histic Epipedon | S4 – Sandy Gleyed Matrix | F2 – Loamy Gleyed Matrix | A10 – 2 cm Muck |
| A3 – Black Histic | S5 – Sandy Redox | F3 – Depleted Matrix | F18 – Reduced Verti |
| A4 – Hydrogen Sulfide | S6 – Stripped Matrix | F6 – Redox Dark Surface | TF2 – Red Parent Material |
| A5 – Stratified Layers | — | F7 – Depleted Dark Surface | Other (See Section 5 of Regional Supplement, Version 2.0) |
| A9 – 1 cm Muck | — | F8 – Redox Depressions | — |
| A11 – Depleted Below Dark Surface | — | F9 – Vernal Pools | — |
| A12 – Thick Dark Surface | — | — | — |

* Table adapted from Regional Supplement to the USACE of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0.

** Indicators of hydrophytic vegetation and wetland hydrology must be present

# Attachment 4 – Arid West OHWM and Wetland Determination Data Sheets

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Villa Serena (15th Street Basin) City/County: Upland/San Bernardino County Sampling Date: 6/24/2022

Applicant/Owner: Diversified Pacific/City of Upland State: CA Sampling Point: 1

Investigator(s): Justin Wood and Jacob Aragon Section, Township, Range: S23, T1S, R5W

Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C-19 Lat: 34° 7'6.40"N Long: 117°38'11.21"W Datum: WGS84

Soil Map Unit Name: Soboba stony loamy sand, 2 to 9 percent slopes NWI classification: PEM1Cx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ✔ No _____ | **Is the Sampled Area within a Wetland?** Yes _____ No ✔ |
| Hydric Soil Present? | Yes _____ No ✔ | |
| Wetland Hydrology Present? | Yes ✔ No _____ | |

Remarks:

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | _____ = Total Cover | | |
| **Sapling/Shrub Stratum (Plot size: 2 m x 2m)** | | | |
| 1. Baccharis salicifolia | 5 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5 = Total Cover | | |
| **Herb Stratum (Plot size: _____)** | | | |
| 1. Cyperus involucratus | 35 | Yes | FACW |
| 2. Ricinus communis | 25 | Yes | FACU |
| 3. Typha latifolia | 5 | No | |
| 4. Echinochloa colona | 5 | No | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 60 = Total Cover | | |
| **Woody Vine Stratum (Plot size: _____)** | | | |
| 1. | | | |
| 2. | | | |
| | _____ = Total Cover | | |

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: | |
|---|---|---|
| OBL species | x 1 = | |
| FACW species 35 | x 2 = | 70 |
| FAC species 5 | x 3 = | 15 |
| FACU species 25 | x 4 = | 75 |
| UPL species | x 5 = | |
| Column Totals: 65 (A) | | 160 (B) |

Prevalence Index = B/A = 2.46

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✔ No _____

Remarks:

## SOIL

Sampling Point: 1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 7.5YR 5/2 | 100 | | | | | Sandy loan | No odor |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes _____ No ✔

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes ✔ No _____ Depth (inches): 4.0

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

**Wetland Hydrology Present?** Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water present about one foot away from sample location.

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** Villa Serena / 15th Street Basin
**Project Number:** 3572.001
**Stream:** 15th Street Basin
**Investigator(s):** Justin Wood and Jacob Brazen
**Date:** 6/24/2022 **Time:** 0930
**Town:** Upland **State:** CA
**Photo begin file#:** **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

**Location Details:**
West end of 15th Street Basin

**Projection:** **Datum:** WGS84
**Coordinates:** 34°07'06.4" N 117°38'11.2" W

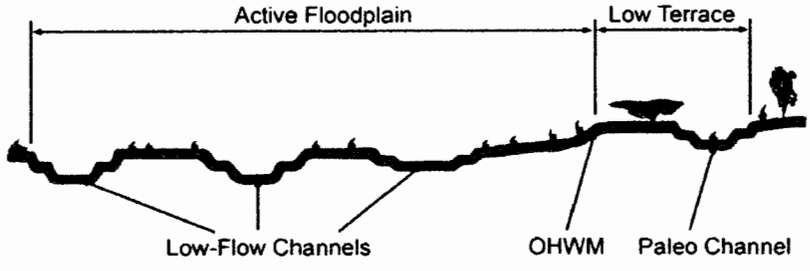
**Potential anthropogenic influences on the channel system:**
Large berm on south side of basin constructed many years ago. Natural upstream flows blocked, only runoff currently enters basin

**Brief site description:**
15th Street Basin. Rounded basin surrounded by development

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates: 5/1994 - 6/2021
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

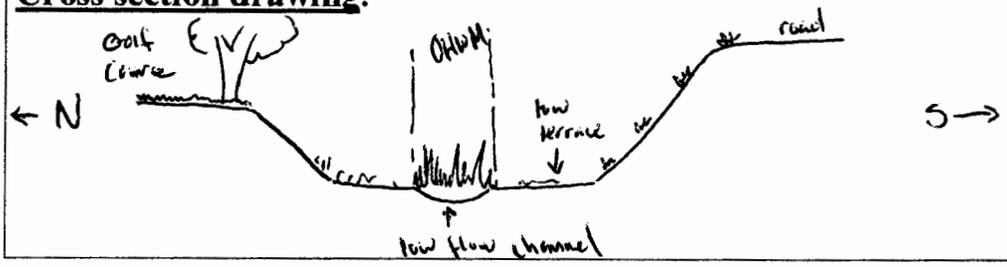



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   ☒ Mapping on aerial photograph ☒ GPS
   ☐ Digitized on computer ☐ Other:

**Project ID:** 3572.001 **Cross section ID:** 1 **Date:** 6/24/2022 **Time:** 0930

**Cross section drawing:**




## OHWM

**GPS point:** 34° 07' 06.4" N, 117° 38' 11.2" W

**Indicators:**

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

## Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** 34° 07' 06.5" N, 117° 38' 11.1 W

**Characteristics of the floodplain unit:**

Average sediment texture: Sandy loam

Total veg cover: ____ % Tree: ____ % Shrub: 5 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☒ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

**Project ID:** 3572.001 **Cross section ID:** 1 **Date:** 6/24/2022 **Time:** 0930

**Floodplain unit:** ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** 34° 07' 06.4" N, 117° 38' 113" W

**Characteristics of the floodplain unit:**

Average sediment texture: Sandy loam

Total veg cover: ____ % Tree: ____ % Shrub: 10 % Herb: 90 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Very dense wetland vegetation near drain entrance.

---

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** _____

**Characteristics of the floodplain unit:**

Average sediment texture: _____

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

# Attachment 5 – Observed Plant Species List and Wetland Indicator

| Attachment 5. Project Species List | | |
|---|---|---|
| **Latin Name** | **Common Name** | **Wetland Indicator Status** |
| **VASCULAR PLANTS** | | |
| **DICOTYLEDONS** | | |
| ADOXACEAE | ELDERBERRY FAMILY | |
| *Sambucus nigra* ssp. *caerulea* | Blue elderberry | FACU |
| ANACARDIACEAE | SUMAC FAMILY | |
| *Rhus aromatica* | Fragrant sumac | FACU |
| *Toxicodendron diversilobum* | Poison oak | FACU |
| APOCYNACEAE | DOGBANE FAMILY | |
| * *Nerium oleander* | Oleander | UPL |
| ASTERACEAE | ASTER FAMILY | |
| *Ambrosia acanthicarpa* | Annual sandbur | UPL |
| *Artemisia californica* | California sagebrush | UPL |
| *Baccharis salicifolia* | Mulefat | FAC |
| *Baccharis sarothroides* | Broom baccharis | FACU |
| * *Centaurea melitensis* | Tocalote | UPL |
| *Ericameria pinifolia* | Pinebush | UPL |
| *Helianthus annuus* | Annual sunflower | FACU |
| * *Helminthotheca echioides* | Bristly ox-tongue | FAC |
| *Heterotheca grandiflora* | Telegraphweed | UPL |
| *Lepidospartum squamatum* | Scalebroom | FACU |
| * *Logfia gallica* | Narrowleaf cottonrose | UPL |
| *Pseudognaphalium canescens* | Wright's cudweed | FACU |
| * *Pulicaria paludosa* | Spanish false fleabane | FAC |
| *Senecio flaccidus* var. *douglasii* | Bush senecio | UPL |
| * *Sonchus asper* ssp. *asper* | Prickly sow thistle | FAC |
| *Xanthium strumarium* | Cocklebur | FAC |
| BORAGINACEAE | BORAGE FAMILY | |
| *Eriodictyon trichocalyx* | Hairy yerba santa | UPL |
| *Pectocarya linearis* ssp. *ferocula* | Slender comb seed | UPL |
| BRASSICACEAE | MUSTARD FAMILY | |
| * *Brassica fruticulosa* | Mediterranean cabbage | UPL |
| * *Hirschfeldia incana* | Short-pod mustard | UPL |
| *Nasturtium officinale* | Watercress | OBL |
| * *Raphanus sativus* | Jointed charlock | UPL |
| * *Sisymbrium orientale* | Indian hedge mustard | UPL |
| CACTACEAE | CACTUS FAMILY | |
| *Opuntia littoralis* | Prickly pear | UPL |
| CHENOPODIACEAE | GOOSEFOOT FAMILY | |
| * *Dysphania ambrosioides* | Mexican tea | FAC |
| * *Salsola tragus* | Russian thistle | FACU |
| CISTACEAE | ROCKROSE FAMILY | |
| *Crocanthemum scoparium* var. *scoparium* | Peak rushrose | UPL |
| CONVOLVULACEAE | MORNINGGLORY FAMILY | |
| *Cuscuta* sp. | Unid. dodder | UPL |
| CUCURBITACEAE | GOURD FAMILY | |
| *Cucurbita foetidissima* | Calabazilla | UPL |
| EUPHORBIACEAE | SPURGE FAMILY | |
| *Croton californicus* | Desert croton | UPL |
| *Croton setiger* | Turkey-mulleion | UPL |
| * *Euphorbia peplus* | Petty spurge | UPL |
| *Euphorbia serpillifolia* | Thyme-leafed spurge | UPL |

| Attachment 5. Project Species List | | |
|---|---|---|
| **Latin Name** | **Common Name** | **Wetland Indicator Status** |
| * *Ricinus communis* | Castor bean | FACU |
| FABACEAE | PEA FAMILY | |
| *Acmispon glaber* | Deerweed | UPL |
| *Astragalus pomonensis* | Pomona milkvetch | UPL |
| * *Melilotus alba* | White sweet-clover | UPL |
| FAGACEAE | BEECH FAMILY | |
| *Quercus agrifolia* | Coast live oak | UPL |
| GROSSULARIACEAE | CURRANT FAMILY | |
| *Ribes aureum* | Golden currant | FAC |
| HYDROPHYLLACEAE | WATERLEAF FAMILY | |
| *Emmenanthe penduliflora* | Whispering bells | UPL |
| *Phacelia ramosissima* | Branching phacelia | FACU |
| LAMIACEAE | MINT FAMILY | |
| * *Marrubium vulgare* | Common horehound | FACU |
| * *Mentha spicata* | Spearmint | UPL |
| LYTHRACEAE | MYRTLE FAMILY | |
| *Lagerstroemia indica* | Crepe myrtle | UPL |
| MORACEAE | MULBERRY FAMILY | |
| * *Morus alba* | White mulberry | FACU |
| MYRSINACEAE | MYRSINE FAMILY | |
| * *Lysimachia arvensis* | Scarlet pimpernel | FAC |
| MYRTACEAE | EUCALYPTUS FAMILY | |
| * *Eucalyptus* sp. | Ornamental eucalyptus | |
| OLEACEAE | OLIVE FAMILY | |
| *Fraxinus uhdei* | Shamel ash | UPL |
| ONAGRACEAE | EVENING PRIMROSE FAMILY | |
| *Camissoniopsis bistorta* | California sun cup | UPL |
| *Epilobium brachycarpum* | Annual fireweed | FAC |
| *Epilobium ciliatum* | Willow-herb | FACW |
| *Ludwigia peploides* | Floating water primrose | OBL |
| PLANTAGINACEAE | PLANTAIN FAMILY | |
| *Penstemon spectabilis* | Showy penstemon | UPL |
| * *Plantago major* | Common plantain | FAC |
| * *Veronica anagallis-aquatica* | Water speedwell | OBL |
| PLANTANACEAE | SYCAMORE FAMILY | |
| *Platanus racemosa* | California sycamore | FAC |
| * *Platanus ×hispanica* | London plane tree | UPL |
| PHRYMACEAE | LOPSEED FAMILY | |
| *Mimulus guttatus* | Seep monkeyflower | OBL |
| POLEMONIACEAE | PHLOX FAMILY | |
| *Navarretia hamata* | Hooked navarretia | UPL |
| POLYGONACEAE | BUCKWHEAT FAMILY | |
| *Eriogonum fasciculatum* | California buckwheat | UPL |
| * *Rumex crispus* | Curly dock | FAC |
| PORTULACAEAE | PURSLANE FAMILY | |
| * *Portulaca oleraceae* | Common purslane | UPL |
| RHAMNACEAE | BUCKTHORN FAMILY | |
| *Frangula californica* | California coffeeberry | UPL |
| ROSACEAE | ROSE FAMILY | |
| *Cercocarpus betuloides* | Birch leaf mountain mahogany | UPL |
| SALICACEAE | WILLOW FAMILY | |

**Attachment 5. Project Species List**

| Latin Name | Common Name | Wetland Indicator Status |
|---|---|---|
| *Salix exigua* | Narrow-leaf willow | FACW |
| *Salix goodingii* | Gooding's black willow | FACW |
| SAPINDACEAE | SOAPBERRY FAMILY | |
| * *Koelreuteria bipinnata* | Goldenrain tree | UPL |
| SOLANACEAE | NIGHTSHADE FAMILY | |
| *Datura wrightii* | Jimsonweed | UPL |
| * *Nicotiana glauca* | Tree tobacco | FAC |
| ULMACEAE | ELM FAMILY | |
| * *Ulmus parvifolia* | Chinese elm | UPL |
| **MONOCOTYLEDONS** | | |
| ARECACEAE | PALM FAMILY | |
| * *Washingtonia filifera* | California fan palm | FAC |
| CYPERACEAE | SEDGE FAMILY | |
| *Carex* sp. | Unid. sedge | |
| * *Cyperus involucratus* | Umbrella sedge | FACW |
| LILIACEAE | LILY FAMILY | |
| *Asparagus asparagoides* | African asparagus fern | UPL |
| POACEAE | GRASS FAMILY | |
| * *Bromus diandrus* | Ripgut brome | UPL |
| * *Bromus madritensis* ssp. *rubens* | Red brome | UPL |
| * *Cynodon dactylon* | Bermuda grass | FACU |
| * *Echinochloa colona* | Jungle rice | FAC |
| * *Ehrharta erecta* | Upright veldt grass | UPL |
| * *Festuca myuros* | Rattail sixweeks grass | UPL |
| * *Hordeum murinum* | Foxtail barley | FACU |
| * *Paspalum dilatatum* | Dallis grass | FAC |
| * *Polypogon monspeliensis* | Annual beard grass | FACW |
| * *Stipa miliacea* | Smilo grass | UPL |
| TYPHACEAE | CATTAIL FAMILY | |
| *Typha latifolia* | Broadleaf cattail | OBL |

Species introduced to California are indicated by an asterisk. Special-status species are indicated by two asterisks. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season (many plants are identifiable only in spring). Plants were identified using keys, descriptions, and illustrations in Baldwin et al (2012). Plant taxonomy and nomenclature generally follow Baldwin et al. (2012). Wetland Indicator Status are defined below. If a species had no status, if was assigned Upland, the least restrictive category.

Notes:

| | |
|---|---|
| UPL (Upland): | Almost never occur in wetlands. |
| FACU (Facultative Upland): | Usually occur in non-wetlands but may occur in wetlands. |
| FAC (Facultative): | Occur in wetlands and non-wetlands. |
| FACW (Facultative Wetland): | Usually occur in wetlands but may occur in non-wetlands. |
| OBL (Obligate): | Almost always occur in wetlands. |

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# APPENDIX E

# GROUNDWATER RECHARGE DATA

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# GROUNDWATER RECHARGE

## PRE-DEVELOPED RECHARGE VOLUME:

The existing 15th Street Basin has an outlet discharge bottom area of approximately 99,092 square feet (2.27 acres) that discharges to existing storm drain to the west and has four separate dead storage ponding areas in the easterly portion of the basin (See Exhibit A & B). The detention basin gently slopes from east to west where it then drains into existing storm drain pipes that route flows into a series of San Bernardino County Flood Control District (SBCFCD) regional detention basins north and south of 8th Street in the City of Upland, CA. The separate storage ponds A, B, C, and D are located just east of the discharge area of the basin (See Exhibits A & B) and are graded resulting in dead storage ponds. The area and volume of each basin can be seen in Table A-1c below. The total existing recharge volume is 280,870.74 cubic feet (6.45 acre-feet).

**SUMMARY OF EXISTING GROUNDWATER RECHARGE VOLUMES**
(Table A-1c)

| POND | AREA (sq. ft.) | RECHARGE VOLUME (cu. ft.) | RECHARGE VOLUME (ac.- ft.) | DEPTH (ft.) |
|---|---|---|---|---|
| **A** | 16331.50 | 34908.03 | 0.80 | 3.0 |
| **B** | 76932.04 | 126516.06 | 2.90 | 2.0 |
| **C** | 19012.55 | 25570.35 | 0.59 | 2.0 |
| **D** | 79252.73 | 93876.30 | 2.16 | 2.0 |
| **TOTAL** | **191528.82** | **280870.74** | **6.45** | |

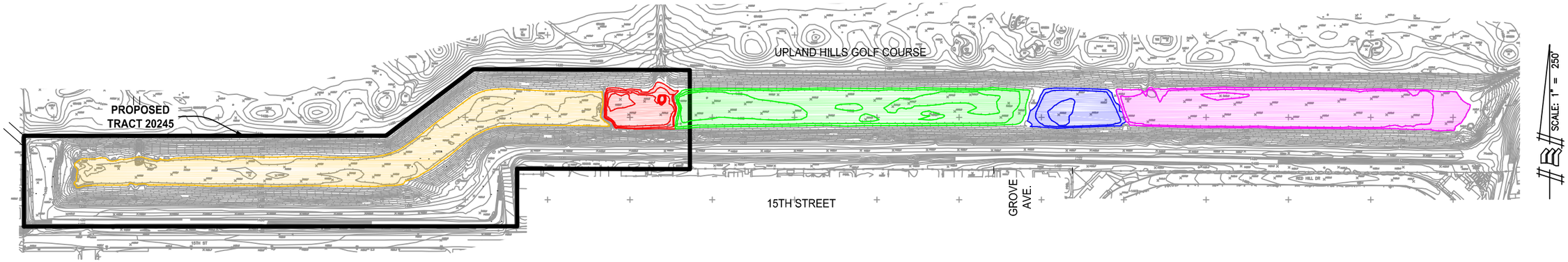
## POST-DEVELOPED RECHARGE VOLUME:

The proposed development will have four sub-areas used for storm water recharge volume (See Exhibits C & D). Pond D will remain in its current condition with a volume of 93,876.30 cubic feet (2.16 acre-feet) of dead storage for groundwater recharge. The bottom of Pond C will be modified, graded, and lowered 7 feet with a new recharge volume of 88,025.40 cubic feet (2.02 acre-feet). The bottom of Pond B will be lowered 7 feet with a new recharge volume of 211,732.65 cubic feet (4.86 acre-feet). The development will also have an onsite water quality bmp system which will have a total recharge volume of 28,809 cubic feet (0.66 acre-feet). The following table (Table A-1d) is a summary of the area and volume of storm water recharge for the post-developed conditions. The total recharge volume will be 422,443.35 cubic feet (9.70 acre-feet).

## SUMMARY OF POST-DEVELOPED GROUNDWATER RECHARGE VOLUMES

(Table A-1d)

| POND | AREA (sq. ft.) | RECHARGE VOLUME (cu. ft.) | RECHARGE VOLUME (ac.- ft.) | DEPTH (ft.) |
|---|---|---|---|---|
| **MODIFIED B** | 45711.12 | 211732.65 | 4.86 | 7.0 |
| **MODIFIED C** | 18332.64 | 88025.40 | 2.02 | 8.0 |
| **D** | 79252.73 | 93876.30 | 2.16 | 2.0 |
| **WQMP ON-SITE** | | 28809.00 | 0.66 | |
| **TOTAL** | **143296.48** | **422443.35** | **9.70** | |




## LEGEND

| | | |
|---|---|---|
| DISCHARGE AREA | | 99,092 SF (2.27 AC) |
| POND A | | 0.80 AC.–FT. |
| POND B | | 2.90 AC.–FT. |
| POND C | | 0.59 AC.–FT. |
| POND D | | 2.16 AC.–FT. |

# EXHIBIT A

## EXISTING RECHARGE BASINS

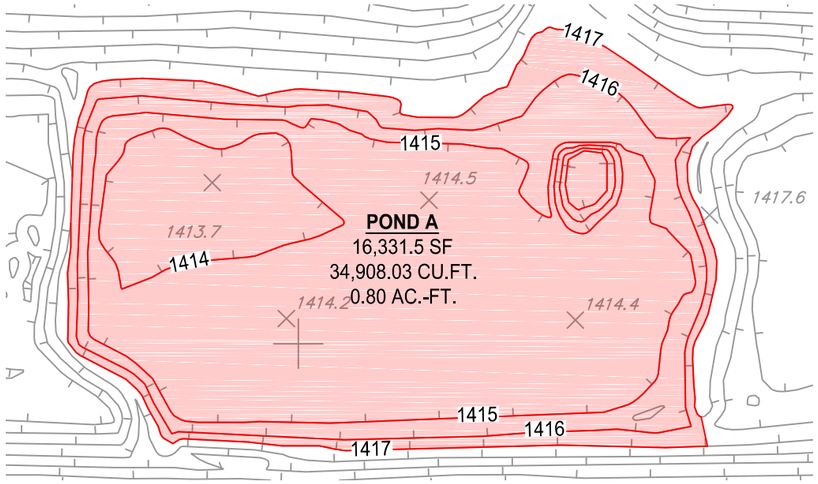
## TRACT 20245

MADOLE & ASSOCIATES, INC
Engineering Communities for Life
9302 PITTSBURGH AVE., SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.4816322
FAX: 909.4816320

JOB NUMBER 652–2898

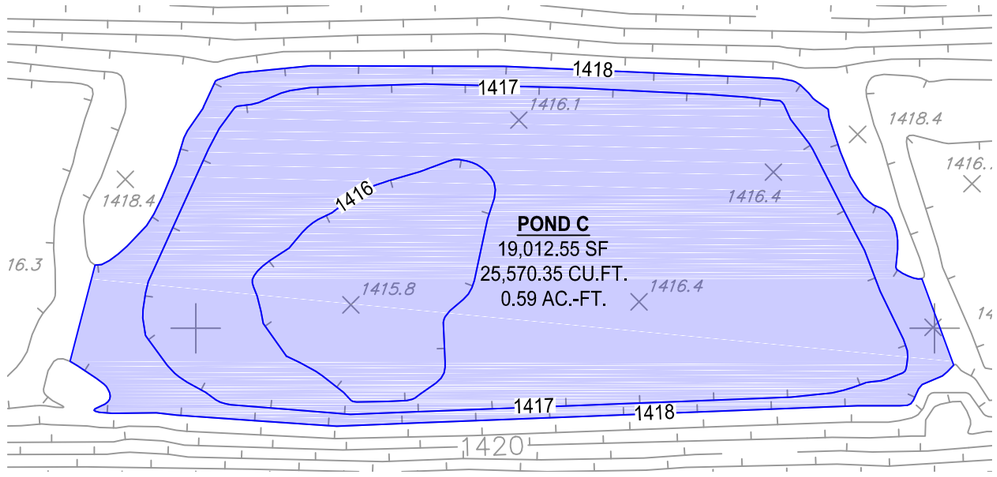
SHEET 1 OF 2

J.N. 652-2898; RECHARGE EXHIBIT



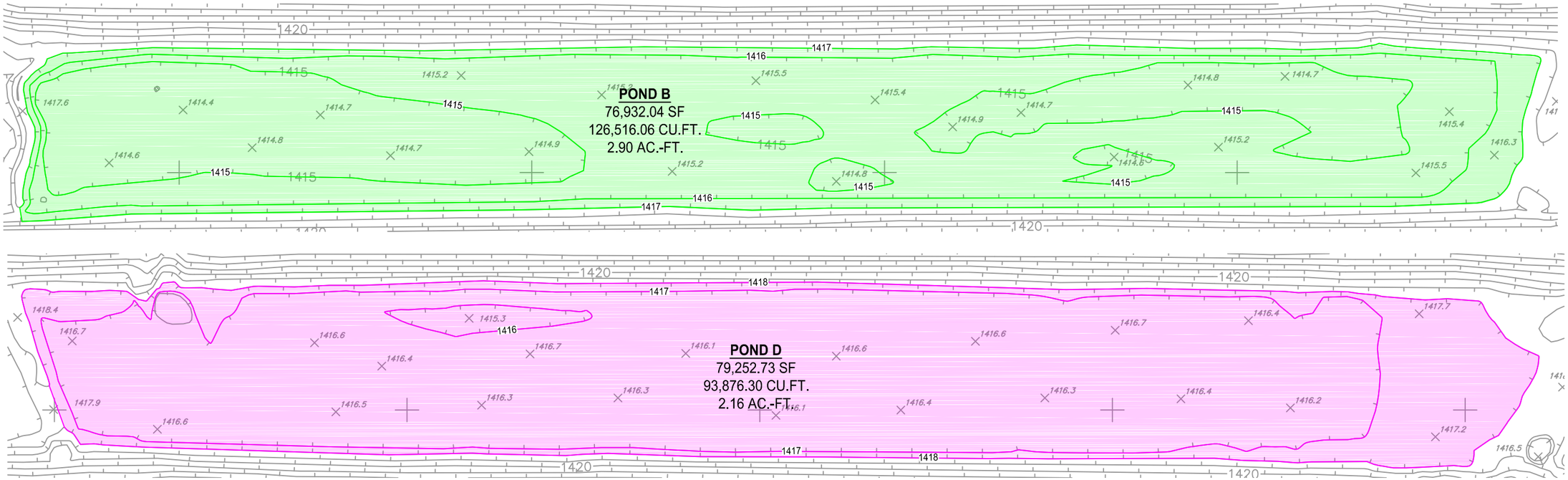

**POND A**
16,331.5 SF
34,908.03 CU.FT.
0.80 AC.-FT.

SCALE: 1" = 40'




**POND C**
19,012.55 SF
25,570.35 CU.FT.
0.59 AC.-FT.

SCALE: 1" = 40'




**POND B**
76,932.04 SF
126,516.06 CU.FT.
2.90 AC.-FT.

**POND D**
79,252.73 SF
93,876.30 CU.FT.
2.16 AC.-FT.

SCALE: 1" = 60'

SCALE: 1" = 60'

# EXHIBIT B

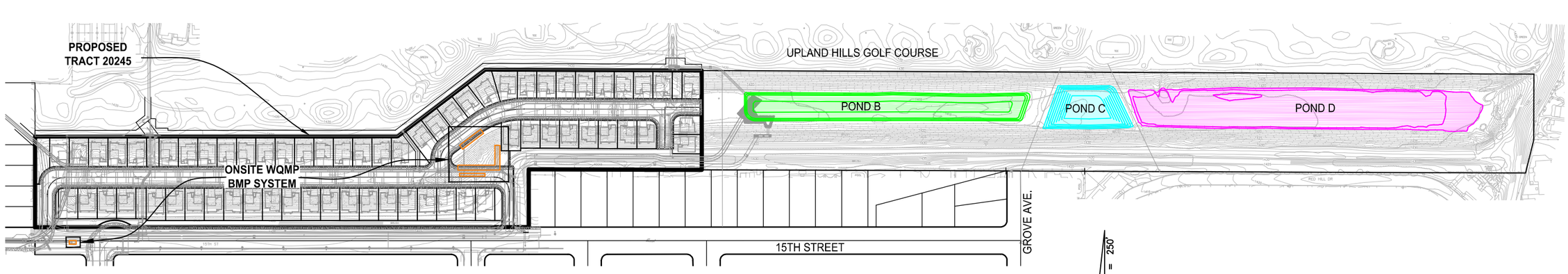
## EXISTING RECHARGE BASINS
## TRACT 20245

MADOLE & ASSOCIATES, INC
Engineering Communities for Life
9302 PITTSBURGH AVE., SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.481.6322
FAX: 909.481.6320

JOB NUMBER 652-2898

SHEET 2 OF 2

J.N. 652-2898; RECHARGE EXHIBIT




LEGEND

| | | |
|---|---|---|
| MODIFIED POND B | | 4.86 AC.–FT. |
| MODIFIED POND C | | 2.02 AC.FT. |
| POND D | | 2.16 AC.–FT. |
| ONSITE WQMP BMP SYSTEM | | 0.66 AC.–FT. |

# EXHIBIT C

## PROPOSED RECHARGE CONDITIONS

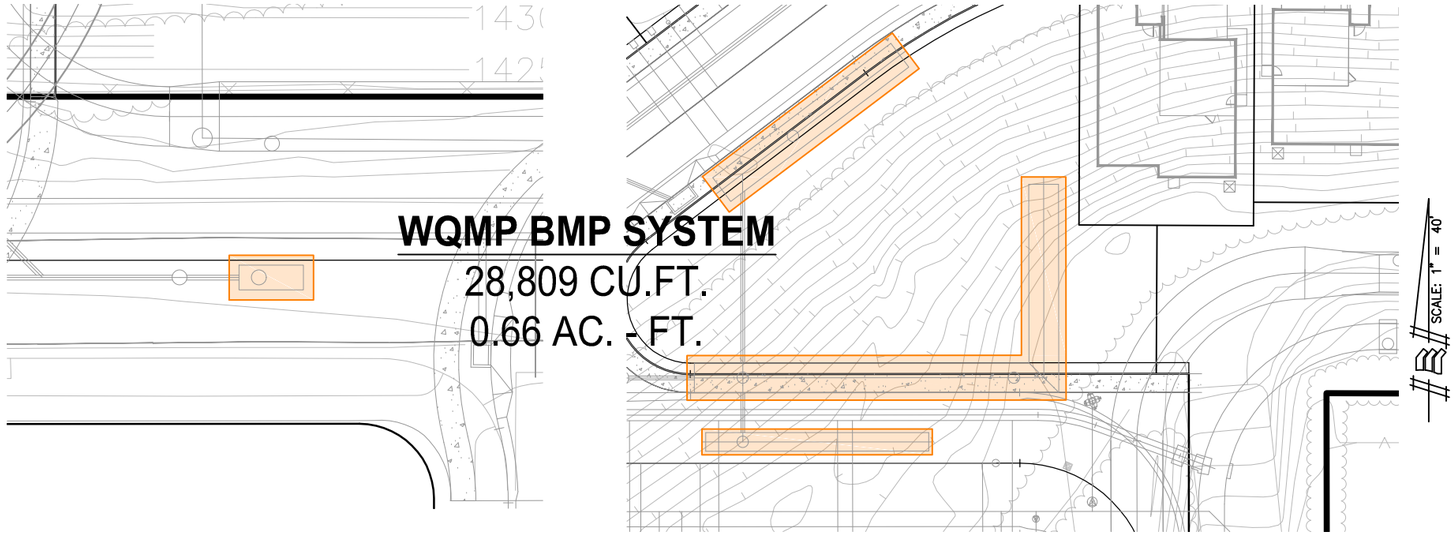
## TRACT 20245

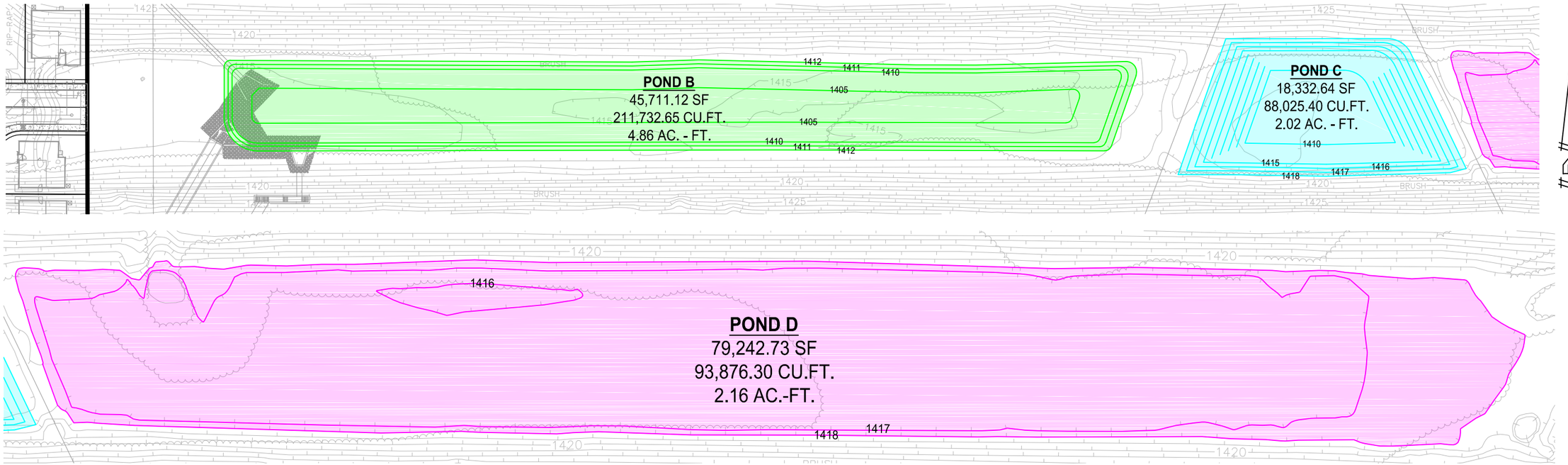
MADOLE & ASSOCIATES, INC
Engineering Communities for Life
9302 PITTSBURGH AVE, SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.481.6322
FAX: 909.481.6320

JOB NUMBER 652–2898

SHEET 1 OF 2

J.N. 652-2898; RECHARGE EXHIBIT




# EXHIBIT D

PROPOSED RECHARGE CONDITIONS

TRACT 20245

MADOLE & ASSOCIATES, INC
Engineering Communities for Life
9302 PITTSBURGH AVE., SUITE 230
RANCHO CUCAMONGA, CA. 91730
PHONE: 909.481.6322
FAX: 909.481.6320

JOB NUMBER 652-2898

SHEET 2 OF 2

J.N. 652-2898; RECHARGE EXHIBIT

# APPENDIX F

# NOISE ASSESSMENT

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October 1, 2024

Mr. Robert D. Dalquest
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

**SUBJECT: VILLA SERENA NOISE ASSESSMENT**

Dear Mr. Robert D. Dalquest:

Urban Crossroads, Inc. is pleased to provide the following Noise Assessment for the Villa Serena Project ("Project"), which is located on the north side of 15th Street in in the City of Upland, as shown on Exhibit A. This Noise Assessment evaluates potential Project noise impacts in the context of applicable City of Upland noise standards and significance criteria based on guidance provided by Section XIII (a) of the Environmental Checklist Form Appendix G of the California Environmental Quality Act (CEQA). (1) In addition, this noise assessment has been revised in response May 8, 2023, City of Upland incomplete notice.

## EXECUTIVE SUMMARY

This Noise Assessment shows that the land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for existing conditions. The Villa Serena Project is not expected to include any specific type of operational noise (stationary source) levels beyond the typical noise sources associated with the planned residential land use. This includes residents moving around the site, parking activities, air conditioning units and background outdoor activities. Residential land use is generally considered a noise-sensitive receiving land use. Using the reference noise levels to represent the proposed Project operations that include residential air conditioning units and other background outdoor activity, the operational noise levels associated with Villa Serena Project will satisfy the City of Upland 55 dBA $L_{eq}$ daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ nighttime (10:00 p.m. to 7:00 a.m.) exterior noise level standards at all nearby receiver locations. In addition, the Project-related operational noise level increases over the ambient noise conditions will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the potential impact will be *less than significant*.

The noise analysis shows that Project construction activities will not exceed the reasonable daytime 80 dBA $L_{eq}$ significance threshold. However, it is expected that the Project-related construction noise activities will generate a *potentially significant* temporary noise level increase. Therefore, a minimum 8 to 12-foot-high temporary noise barrier is required adjacent to the existing noise sensitive residences. With the required 8 to 12-foot-high temporary noise barrier and the construction noise mitigation measures outlined in this noise assessment, the construction noise impacts are considered *less than significant*.

Mr. Robert D. Dalquest
City of Upland
October 1, 2024

## PROJECT DESCRIPTION

The preliminary site plan for the proposed Project is shown on Exhibit B. The proposed Project includes the development of 66 single family residential dwelling units, the 15th Street extension and the basin trail. The Villa Serena is not expected to include any specific type of operational noise (stationary source) levels beyond the typical noise sources associated with the planned residential land use. This includes residents moving around the site, parking activities, air conditioning units and background outdoor activities. Residential land use is generally considered a noise-sensitive receiving land use.

## PROJECT BACKGROUND

On July 20, 2018, Urban Crossroads, Inc. prepared the *Upland Colonies Noise Impact Analysis (NIA).* The NIA evaluated the on-site traffic noise level impacts to future residents of the Project and assessed the potential off-site construction noise and vibration impacts to the adjacent existing residential community. The purpose of this work effort is to assess the potential the Project related traffic noise level increases and the operational noise levels increases associated with the planned residential land use in response to the Superior Court ruling included in Appendix A. According to the ruling from Judge David Cohn, the NIA did not evaluate *the impacts of the Project compared to the Ambient Noise Level*. The analysis provided in this Noise Assessment was prepared to evaluate the incremental noise level increases or impacts of the Project in comparison to the existing ambient noise levels.

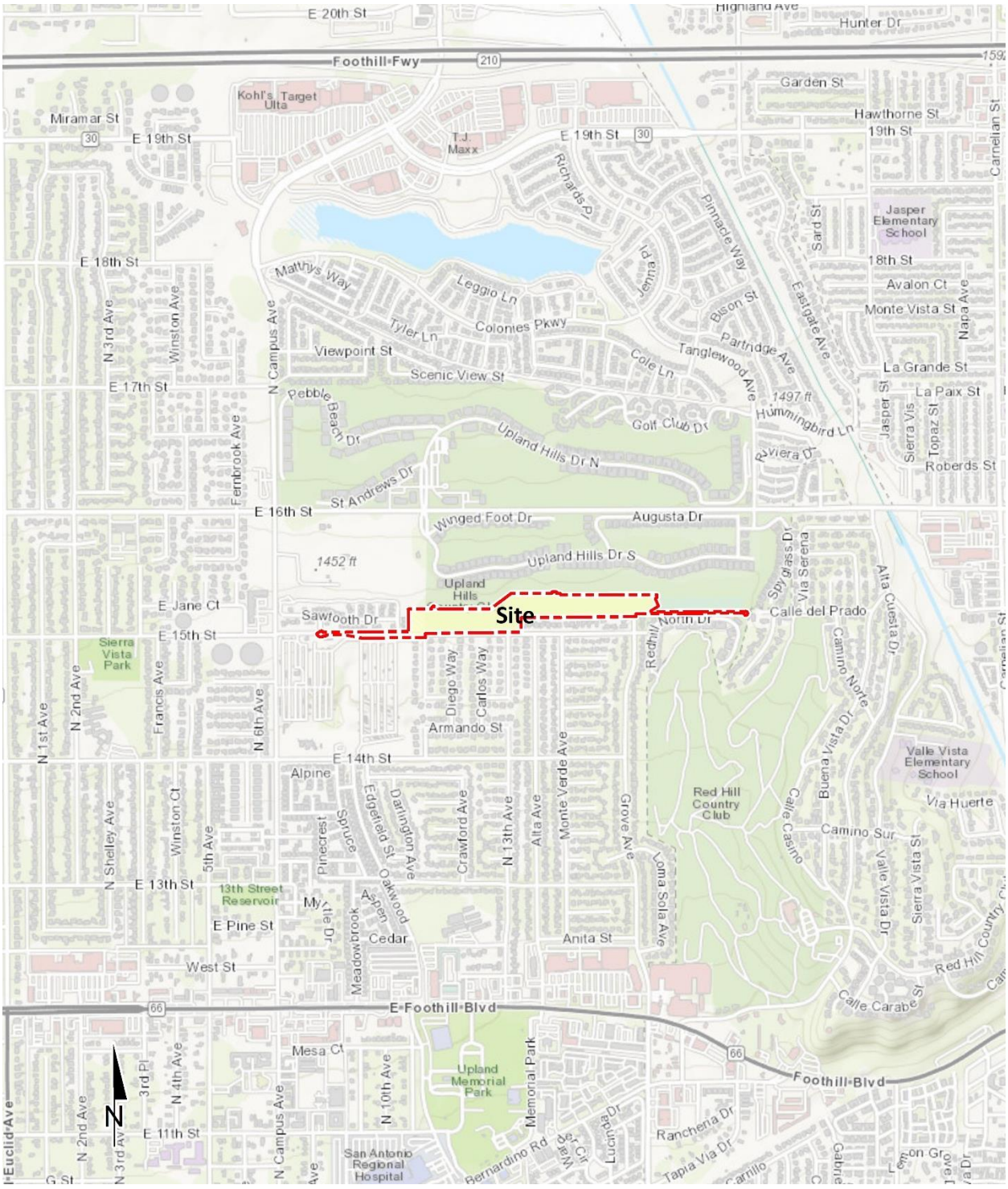
## NOISE DESCRIPTORS

According to the *Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol*, the proper noise descriptor to use in any given situation depends on the nature of the noise source. For example, a high amplitude short duration event such as gunshot requires a different descriptor than a constant relatively low amplitude noise source such as traffic. The proper descriptor depends on the spatial distribution of noise sources, duration of the noise event, amount of fluctuation, and time patterns. Dozens of descriptors and scales have been devised over the years to quantify community noise, aircraft flyovers, traffic noise, industrial noise, speech interference, etc. (2) Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used figure is the equivalent level ($L_{eq}$). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment. The City of Upland relies on the equivalent level ($L_{eq}$) to assess operational activities associated with non-transportation transportation related stationary noise sources.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized.

Mr. Robert D. Dalquest
City of Upland
October 1, 2024

**EXHIBIT A: LOCATION MAP**



Mr. Robert D. Dalquest
City of Upland
October 1, 2024

**EXHIBIT B: SITE PLAN**



The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA $L_{eq}$ sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA $L_{eq}$ sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Upland relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

## OFF-SITE TRAFFIC NOISE LEVEL INCREASES

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Environmental Checklist Form XIII (a) Noise Guidelines at the nearest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach *recognizes that there is no single noise increase that renders the noise impact significant.* (3) The City of Upland General Plan Safety Element Table SAF-4 *Exterior Incremental Noise Impact Standards for Noise Sensitive Use* outlines the allowable noise exposure increases that are derived from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual.* To describe the amount to which a given noise level increase is considered acceptable, the FTA criteria is used to evaluate the incremental noise level increase and establishes a method for comparing future project noise with existing ambient conditions under CEQA Significance Threshold A. In effect, the amount to which a given noise level increase is considered acceptable is reduced based on existing ambient noise conditions. Table 1 presents the allowable noise exposure increase levels.

**TABLE 1: ALLOWABLE NOISE EXPOSURE LEVELS**

| Analysis | Condition(s) | Significance Criteria | |
|---|---|---|---|
| | | Daytime | Nighttime |
| Off-Site Traffic[1] | If ambient is < 50 dBA CNEL | ≥ 8 dBA CNEL Project increase | |
| | If ambient is 50 - 55 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | If ambient is 55 - 60 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | If ambient is 60 - 65 dBA CNEL | ≥ 2 dBA CNEL Project increase | |
| | If ambient is 65 - 75 dBA CNEL | ≥ 1 dBA CNEL Project increase | |
| | If ambient is > 75 dBA CNEL | 0 dBA CNEL Project increase | |

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, consistent with the City of Upland General Plan.

Consistent with the City of Upland General Plan Safety Element, the 24-hour CNEL level is used to assess land use compatibility with transportation related noise sources. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. This is consistent with

the Noise Compatible Land Use Planning guidance provided by Appendix D: Noise Element Guidelines from the State of California General Plan Guidelines. (4)

## FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (5) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (6) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (7) Table 2 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. The ADT volumes used in this study are presented on Table 3 are based on the *Villa Serena Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (8)

**TABLE 2: OFF-SITE ROADWAY PARAMETERS**

| ID | Roadway | Segment | Receiving Land Use[1] | Classification[2] | Centerline Distance to Receiving Land Use | Vehicle Speed (mph)[3] |
|---|---|---|---|---|---|---|
| 1 | Campus Av. | n/o 16th St. | Sensitive | Secondary | 44' | 40 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | Secondary | 44' | 40 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | Secondary | 44' | 40 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | Secondary | 44' | 40 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | Secondary | 44' | 45 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | Secondary | 44' | 45 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | Collector | 33' | 35 |
| 8 | 15th St. | e/o Campus Av. | Sensitive | Collector | 33' | 25 |
| 9 | 15th St. | w/o Grove Av. | Sensitive | Collector | 33' | 25 |
| 10 | 14th St. | w/o Campus Av. | Sensitive | Collector | 33' | 35 |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] City of Upland General Plan Circulation Element
[3] Upland Colonies Traffic Analysis, Urban Crossroads, Inc.

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. In addition, the off-site traffic noise analysis maintains a

peak hour to average daily traffic (peak-to-daily) relationship of 7.9%. This analysis relies on a comparative analysis of the off-site traffic noise impacts, without and with project ADT traffic volumes from the Project traffic study. Table 4 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 5 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

**TABLE 3: AVERAGE DAILY TRAFFIC VOLUMES**

| ID | Roadway | Segment | Average Daily Traffic Volumes[1] | | | |
|---|---|---|---|---|---|---|
| | | | Existing | | OYC | |
| | | | Without Project | With Project | Without Project | With Project |
| 1 | Campus Av. | n/o 16th St. | 20,900 | 21,084 | 22,885 | 23,069 |
| 2 | Campus Av. | s/o 16th St. | 20,354 | 20,630 | 22,946 | 23,222 |
| 3 | Campus Av. | n/o 14th St. | 19,427 | 19,733 | 22,284 | 22,590 |
| 4 | Campus Av. | s/o 14th St. | 16,608 | 16,730 | 19,613 | 19,735 |
| 5 | 16th St. | w/o Campus Av. | 22,614 | 22,644 | 24,318 | 24,348 |
| 6 | 16th St. | e/o Campus Av. | 23,465 | 23,527 | 25,221 | 25,283 |
| 7 | 15th St. | w/o Campus Av. | 2,870 | 2,900 | 3,365 | 3,395 |
| 8 | 15th St. | e/o Campus Av. | 100 | 609 | 105 | 614 |
| 9 | 15th St. | w/o Grove Av. | 127 | 219 | 135 | 227 |
| 10 | 14th St. | w/o Campus Av. | 3,581 | 3,673 | 4,120 | 4,212 |

[1] Upland Colonies Traffic Analysis, Urban Crossroads, Inc.

**TABLE 4: TIME OF DAY VEHICLE SPLITS**

| Vehicle Type | Time of Day Splits | | | Total of Time of Day Splits |
|---|---|---|---|---|
| | Daytime | Evening | Nighttime | |
| Autos | 77.50% | 12.90% | 9.60% | 100.00% |
| Medium Trucks | 84.80% | 4.90% | 10.30% | 100.00% |
| Heavy Trucks | 86.50% | 2.70% | 10.80% | 100.00% |

"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

**TABLE 5: TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)**

| Roadway Classification | Total % Traffic Flow | | | Total |
|---|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks | |
| All Roadways | 97.42% | 1.84% | 0.74% | 100.00% |

Typical California Vehicle Mix.

## OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed for each traffic scenario described in the *Villa Serena Traffic Study*. (8) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at receiving land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA CNEL noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 6 through 9 present a summary of the exterior dBA CNEL traffic noise level, for existing, and opening year cumulative conditions without and with Project conditions. Appendix A includes a summary of the dBA CNEL traffic noise level contour for each of the traffic scenarios.

**TABLE 6: EXISTING CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | RW | 92 | 198 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | RW | 90 | 194 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | RW | 87 | 188 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | RW | 79 | 170 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | RW | 118 | 253 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | RW | 121 | 260 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.1 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.1 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.1 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.1 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7: EXISTING WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | RW | 92 | 199 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | RW | 91 | 196 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | RW | 79 | 171 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | RW | 118 | 254 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | RW | 121 | 260 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.2 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 50.9 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 46.5 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.2 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 8: OPENING YEAR CUMULATIVE CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 70.2 | RW | 98 | 210 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 70.2 | RW | 98 | 210 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 70.1 | RW | 96 | 206 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.7 | RW | 123 | 266 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.9 | 59 | 126 | 272 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.8 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.3 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.4 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.7 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 9: OPENING YEAR CUMULATIVE WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Nearest Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 70.2 | RW | 98 | 211 |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 70.2 | RW | 98 | 212 |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 70.1 | RW | 97 | 208 |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 69.5 | RW | 88 | 190 |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.7 | RW | 124 | 266 |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.9 | 59 | 127 | 273 |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.8 | RW | RW | RW |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 51.0 | RW | RW | RW |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 46.6 | RW | RW | RW |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.8 | RW | RW | RW |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

## PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze the existing traffic scenarios identified in the *Villa Serena Traffic Study*. (8) However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until future conditions when the Project is built and fully occupied. Table 6 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 43.1 to 71.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7 shows the Existing with Project conditions range from 46.5 to 71.6 dBA CNEL. Table 10 shows that the Project off-site traffic noise level increases range from 0.0 to 7.8 dBA CNEL on the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for existing conditions.

**TABLE 10: EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | | | Incremental Noise Level Increase Threshold | |
|---|---|---|---|---|---|---|---|---|
| | | | | No Project | With Project | Project Addition | Limit[3] | Exceeded[4] |
| 1 | Campus Av. | n/o 16th St. | Sensitive | 69.8 | 69.8 | 0.0 | 1 | No |
| 2 | Campus Av. | s/o 16th St. | Sensitive | 69.7 | 69.7 | 0.0 | 1 | No |
| 3 | Campus Av. | n/o 14th St. | Sensitive | 69.5 | 69.5 | 0.0 | 1 | No |
| 4 | Campus Av. | s/o 14th St. | Sensitive | 68.8 | 68.8 | 0.0 | 1 | No |
| 5 | 16th St. | w/o Campus Av. | Sensitive | 71.4 | 71.4 | 0.0 | 1 | No |
| 6 | 16th St. | e/o Campus Av. | Sensitive | 71.6 | 71.6 | 0.0 | 1 | No |
| 7 | 15th St. | w/o Campus Av. | Sensitive | 61.1 | 61.2 | 0.1 | 2 | No |
| 8 | 15th St. | e/o Campus Av. | Sensitive | 43.1 | 50.9 | 7.8 | 8 | No |
| 9 | 15th St. | w/o Grove Av. | Sensitive | 44.1 | 46.5 | 2.4 | 8 | No |
| 10 | 14th St. | w/o Campus Av. | Sensitive | 62.1 | 62.2 | 0.1 | 2 | No |

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] City of Upland General Plan Table SAF-4.
[4] Does the Project create an incremental noise level increase exceeding the significance criteria?

Table 8 presents the Opening Year Cumulative without Project conditions CNEL noise levels. The Opening Year Cumulative without Project exterior noise levels are expected to range from 43.3 to 71.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 9 shows the Opening Year Cumulative with Project conditions will range from 46.6 to 71.9 dBA CNEL. Table 11 shows that the Project off-site traffic noise level increases will range from 0.0 to 7.7 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic for Opening Year Cumulative conditions

## EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit C provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Tuesday, August 31, 2021. Appendix B includes study area photos.

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City of Upland
October 1, 2024

**EXHIBIT C: NOISE MEASUREMENT LOCATIONS**



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## MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (9)

## NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. These measurement locations were collected at locations that are intended to best describe the existing ambient noise levels within the noise sensitive receiver locations near the Project. In addition, due to the long-term nature of these measurements, the noise level meters are placed in locations where the meter can be securely positioned to avoid any interference. Measurement locations L1 and L2 were selected to describe the noise sensitive residential homes within the Upland Hills Country Club. Measurement locations, L3, L4 and L5 were selected to describe the existing residential community south of the Project Site on 15$^{th}$ Street.

Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (10)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (10) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

## NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels ($L_{eq}$). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 12 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. The daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix C provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, $L_1$, $L_2$, $L_5$, $L_8$, $L_{25}$, $L_{50}$, $L_{90}$, $L_{95}$, and $L_{99}$ percentile noise levels observed during the daytime and nighttime periods.

Table 12 shows that the existing ambient noise level at measurements locations L1 to L5 are consistent with the quiet nature of the surrounding residential community. While there is some variation in the individual noise levels at each location, the noise levels on Table 12 represent the average of all hourly noise levels observed during these time periods expressed as a single number.

**TABLE 12: AMBIENT NOISE LEVEL MEASUREMENTS**

| Location[1] | Description | Energy Average Noise Level (dBA $L_{eq}$)[2] | |
|---|---|---|---|
| | | Daytime | Nighttime |
| L1 | Located north of the Project site near single-family residence at 1168 Upland Hills Drive South. | 47.2 | 42.5 |
| L2 | Located east of the Project site near single-family residence at 8269 Calle Del Prado. | 43.6 | 39.3 |
| L3 | Located south of the Project site near single-family residence at 1335 East 15th Street. | 47.2 | 40.6 |
| L4 | Located south of the Project site near single-family residence at 1497 Fernando Avenue. | 45.7 | 41.0 |
| L5 | Located west of the Project site near single-family residence at 1520 North Himalayas Circle. | 42.6 | 38.5 |

[1] See Exhibit C for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix C. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

Mr. Robert D. Dalquest
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## RECEIVER LOCATIONS

To assess the potential for long-term operational noise impacts, the following receiver locations, as shown on Exhibit D, were identified as representative locations for focused analysis. This includes additional receiver locations adjacent to the 15th Street extension and the basin trail. While the existing noise level measurement locations are used to describe the existing background ambient noise conditions in the Project study area, the receiver locations are used to calculate the Project operational noise levels at potentially impact nearby noise sensitive residences. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Noise-sensitive receivers near the Project site include the existing residential homes located to the west of the Project site on Himalayas Circle, south on 15th Street and north on Upland Hills Drive. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

## NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level ($L_w$) to describe individual noise sources. The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix D includes the detailed noise model inputs.

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**EXHIBIT D: RECEIVER LOCATIONS**



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## OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations resulting from the operation of the proposed Villa Serena Project. This operational noise analysis is intended to describe noise level impacts associated with the typical activities expected at the Project site. The on-site Project-related noise sources shown on Exhibit E are expected to include residential air conditioning units and other background outdoor activity. This noise source activity is representative of the planned residential land use that is not expected to produce any type of peak or single event noise source activities.

To estimate the Project operational noise impacts, reference sound power levels ($L_w$) were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. While sound pressure levels (e.g. $L_{eq}$) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels ($L_w$) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The reference Project operational sound power noise levels are summarized below:

- A/C Condenser Units: 73 dBA $L_w$ according to the reference product data sheet for the Bryant 124ANS Series 5-Ton Air Conditioner Unit.
- Background Outdoor Activity: 75 dBA $L_w$ based on reference outdoor noise level measurements collected by Urban Crossroads, Inc.

### PROJECT OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Villa Serena Project, stationary-source (operational) noise such as the expected residential air conditioning units and other background outdoor activity are typically evaluated against standards established under a jurisdiction's Municipal Code. The City of Upland noise control guidelines for determining and mitigating non-transportation or stationary noise source impacts from operations in neighboring residential areas are found in Chapter 9.40 of the Municipal Code, provided in Appendix D. The performance standards found in Chapter 9.40 limit the base exterior noise level to 55 dBA $L_{eq}$ during the daytime hours from 7:00 am to 10:00 p.m., and 45 dBA $L_{eq}$ during the nighttime hours from 10:00 p.m. 7:00 a.m. at sensitive residential receiver locations. (11)

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**EXHIBIT E: PROJECT OPERATIONAL NOISE SOURCE LOCATIONS**



## PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include residential air conditioning units and other background outdoor activity, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 13 shows that the daytime Project operational noise at the off-site receiver locations with the planned 6-foot-high wall is expected to range from 30.9 to 51.3 dBA $L_{eq}$. It is important to recognize that the operational noise analysis includes all sixty-six air conditioning units and outdoor activities all operating at the same time without accounting for any of the planned residential building structures. In real world operating conditions, the air conditioning units will cycle on and off throughout the day and night. Therefore, the noise levels presented below conservatively overstate the Project operational noise levels.

**TABLE 13: PROJECT OPERATIONAL NOISE LEVELS**

| Receiver Location[1] | Project Operational Noise Levels (dBA Leq)[2] | | Noise Level Standards (dBA Leq)[3] | | Noise Level Standards Exceeded?[4] | |
|---|---|---|---|---|---|---|
| | Daytime | Nighttime | Daytime | Nighttime | Daytime | Nighttime |
| R1 | 43.8 | 34.1 | 55 | 45 | No | No |
| R2 | 50.0 | 35.3 | 55 | 45 | No | No |
| R3 | 30.9 | 19.6 | 55 | 45 | No | No |
| R4 | 35.9 | 20.6 | 55 | 45 | No | No |
| R5 | 44.6 | 33.6 | 55 | 45 | No | No |
| R6 | 51.3 | 36.2 | 55 | 45 | No | No |
| R7 | 46.7 | 33.6 | 55 | 45 | No | No |
| R8 | 43.3 | 30.0 | 55 | 45 | No | No |
| R9 | 32.9 | 21.6 | 55 | 45 | No | No |
| R10 | 45.2 | 31.4 | 55 | 45 | No | No |

[1] See Exhibit D for the receiver locations.
[2] Proposed Project unmitigated operational noise level calculations are included in Appendix E.
[3] City of Upland Municipal Code Chapter 9.40. (Appendix D).
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Upland exterior noise level standards at the nearest noise-sensitive receiver locations. Table 13 shows the operational noise levels associated with Villa Serena Project will not exceed the City of Upland 55 dBA $L_{eq}$ daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA $L_{eq}$ nighttime (10:00 p.m. to 7:00 a.m.) exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearest noise-sensitive receiver locations.

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## PROJECT OPERATIONAL NOISE LEVEL INCREASES

Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of receivers to determine if a noise increase represents a significant adverse environmental impact (3). This approach recognizes that there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an effective way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. As indicated on Table 14, the Project will generate a daytime operational noise level increase ranging from 0.2 to 5.5 dBA $L_{eq}$ at the nearest receiver locations. Table 15 shows that the Project will generate a nighttime operational noise level increase ranging from 0.0 to 1.3 dBA $L_{eq}$ at the nearest receiver locations. To describe the amount to which a given noise level increase is considered substantial (Threshold A), the City of Upland General Plan outlines criteria (Table SAF-4) to evaluate the incremental noise level increase and establishes a method for comparing future project noise with existing ambient conditions under CEQA Significance Noise Threshold A. Based on the significance criteria presented in Table 1, the Project-related operational noise level increases will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the impact will be *less than significant.*

**TABLE 14: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES**

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 43.8 | L1 | 47.2 | 48.8 | 1.6 | 8 | No |
| R2 | 50.0 | L1 | 47.2 | 51.8 | 4.6 | 8 | No |
| R3 | 30.9 | L2 | 43.6 | 43.8 | 0.2 | 8 | No |
| R4 | 35.9 | L2 | 43.6 | 44.3 | 0.7 | 8 | No |
| R5 | 44.6 | L3 | 47.2 | 49.1 | 1.9 | 8 | No |
| R6 | 51.3 | L3 | 47.2 | 52.7 | 5.5 | 8 | No |
| R7 | 46.7 | L3 | 47.2 | 50.0 | 2.8 | 8 | No |
| R8 | 43.3 | L4 | 45.7 | 47.7 | 2.0 | 8 | No |
| R9 | 32.9 | L5 | 42.6 | 43.0 | 0.4 | 8 | No |
| R10 | 45.2 | L5 | 42.6 | 47.1 | 4.5 | 8 | No |

[1] See Exhibit D for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 16.
[3] Reference noise level measurement locations as shown on Exhibit C.
[4] Observed daytime ambient noise levels as shown on Table 15.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] City of Upland General Plan Table SAF-4.

**TABLE 15: NIGHTTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES**

| Receiver Location[1] | Total Project Operational Noise Level[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 34.1 | L1 | 42.5 | 43.1 | 0.6 | 8 | No |
| R2 | 35.3 | L1 | 42.5 | 43.3 | 0.8 | 8 | No |
| R3 | 19.6 | L2 | 39.3 | 39.3 | 0.0 | 8 | No |
| R4 | 20.6 | L2 | 39.3 | 39.4 | 0.1 | 8 | No |
| R5 | 33.6 | L3 | 40.6 | 41.4 | 0.8 | 8 | No |
| R6 | 36.2 | L3 | 40.6 | 41.9 | 1.3 | 8 | No |
| R7 | 33.6 | L3 | 40.6 | 41.4 | 0.8 | 8 | No |
| R8 | 30.0 | L4 | 41.0 | 41.3 | 0.3 | 8 | No |
| R9 | 21.6 | L5 | 38.5 | 38.6 | 0.1 | 8 | No |
| R10 | 31.4 | L5 | 38.5 | 39.3 | 0.8 | 8 | No |

[1] See Exhibit D for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 16.
[3] Reference noise level measurement locations as shown on Exhibit C.
[4] Observed nighttime ambient noise levels as shown on Table 15.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] City of Upland General Plan Table SAF-4.

### COMMUNITY RESPONSE TO NOISE

Community responses to noise vary depending upon everyone's susceptibility to noise and personal attitudes about noise. Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (12) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (12) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit F. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (13) An increase of 10 dBA is considered twice as loud.

The operational noise level increase analysis shows that the nearest noise sensitive residential receivers will potentially experience a background ambient noise level increases are considered *barely* or *readily perceptible.* This finding is conservatively based on all sixty-six air conditioning units and outdoor activities all operating at the same time without accounting for any building structures or planned perimeter walls.

## CONSTRUCTION NOISE ANALYSIS

To control noise impacts associated with the construction of the proposed Project, the City of Upland has established limits to the hours of operation. Section 9.40.100[M] of the City's Municipal Code states: *It is unlawful for any person to engage in or permit the erection (including excavation), demolition, alteration or repair of any building other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays…* (14) However, neither the City of Upland General Plan Noise Element nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below. According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA $L_{eq}$ as a reasonable threshold for noise sensitive residential land use (10 p. 179).

### CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction

equipment reference noise emission levels. (15) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for general construction noise assessment, the loudest construction equipment represented by the combined noise levels for graders, excavators and compactors represent a sound power level of 115 $L_w$, assuming they operate at the same time. Appendix G includes the detailed CadnaA construction noise model inputs.

## CONSTRUCTION NOISE ANALYSIS

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations shown on Exhibit F, a construction-related daytime noise level threshold of 80 dBA $L_{eq}$ is used as a reasonable threshold to assess the daytime construction noise level impacts. Table 16 shows that the construction noise levels are expected to range from 50.7 to 63.6 dBA $L_{eq}$ at the nearby receiver locations and will not exceed the reasonable daytime 80 dBA $L_{eq}$ significance threshold. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

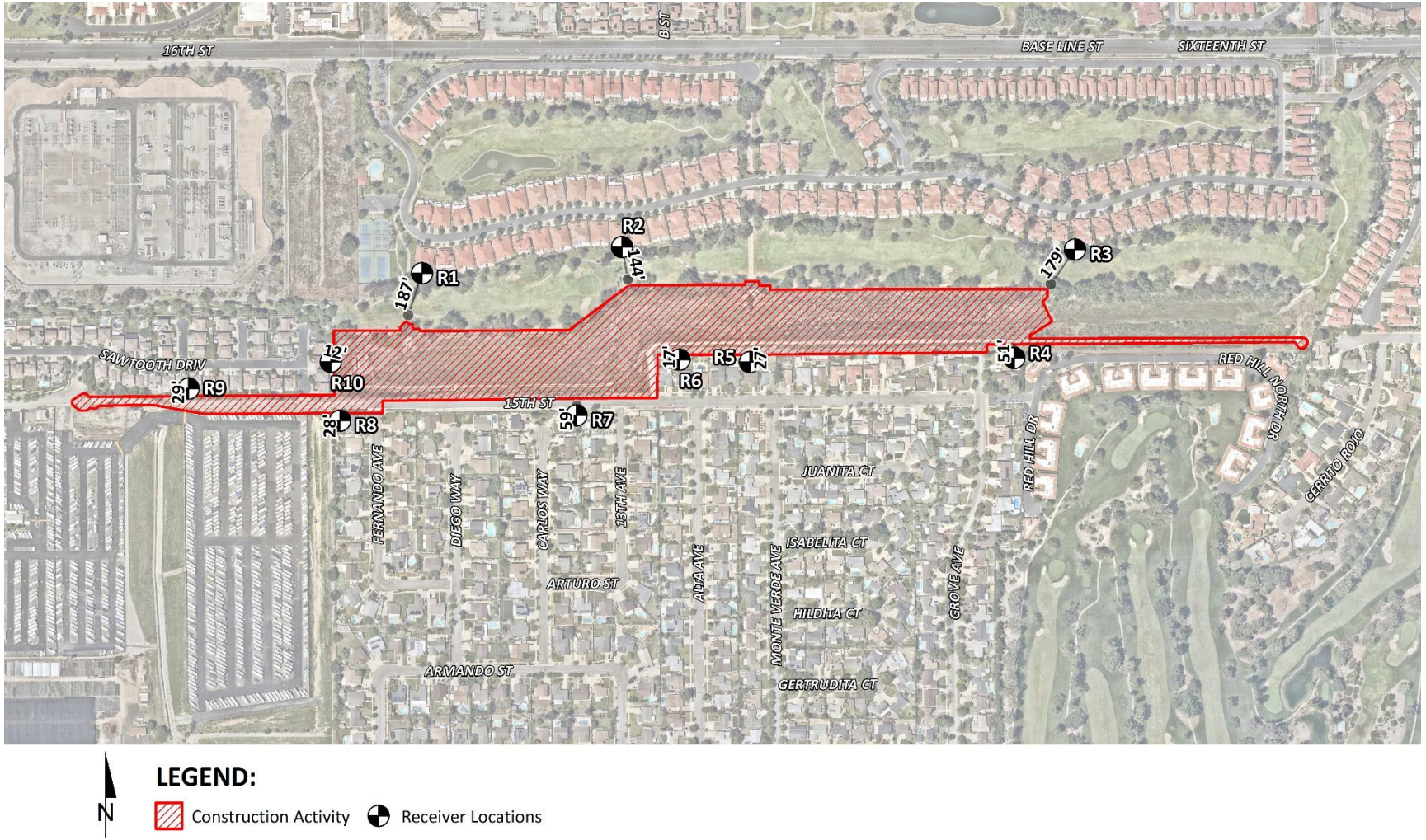
**TABLE 16: CONSTRUCTION NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | Highest Construction Noise Levels[2] | Threshold[3] | Threshold Exceeded?[4] |
| R1 | 55.0 | 80 | No |
| R2 | 56.6 | 80 | No |
| R3 | 50.7 | 80 | No |
| R4 | 53.6 | 80 | No |
| R5 | 61.6 | 80 | No |
| R6 | 63.6 | 80 | No |
| R7 | 56.8 | 80 | No |
| R8 | 59.2 | 80 | No |
| R9 | 55.9 | 80 | No |
| R10 | 60.5 | 80 | No |

[1] Construction noise source and receiver locations are shown on Exhibit F.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations.
[3] FTA Transit Noise and Vibration Impact Assessment Manual.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

Mr. Robert D. Dalquest
City of Upland
October 1, 2024

**EXHIBIT F: PROJECT CONSTRUCTION NOISE SOURCE LOCATIONS**



## CONSTRUCTION NOISE LEVEL INCREASE

To control the noise-generating construction activities, the temporary noise level increases over the existing *ambient* conditions must be considered under CEQA Significance Threshold A. In California a *substantial* noise increase occurs when the project's predicted noise level exceeds the existing *ambient* noise level by 12 dBA or more. (16) The use of 12 dB was established in California many years ago and is based on the concept that a 10 dB increase generally is perceived as a doubling of loudness. (2 pp. 3-2) Therefore, if the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA $L_{eq}$, then the Project construction noise level increases will be considered a *potentially significant impact*.

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing *ambient* noise levels measurements at the nearest off-site receiver locations. The difference between the combined Project-construction and ambient noise levels is used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the *ambient* daytime conditions are presented on Table 17. As indicated in Table 17, the Project will contribute unmitigated construction noise level increases ranging from 7.9 to 18.0 dBA $L_{eq}$ during the daytime hours at the closest receiver locations. The unmitigated construction noise analysis shows that the nearest receiver locations will exceed the Caltrans *substantial* 12 dBA $L_{eq}$ noise level increase significance threshold during Project construction activities. The temporary construction noise level increase analysis shows that the noise impacts due to Project-related construction noise are considered *potentially significant* without mitigation.

Therefore, a minimum 8 to 12-foot-high temporary noise barrier is required adjacent to the existing noise sensitive residences as shown on Exhibit G. Table 18 shows that the mitigated construction noise levels at the nearest noise sensitive receiver locations are expected to range from 50.7 to 58.1 dBA $L_{eq}$. Appendix H includes the mitigated construction CadnaA noise calculations. The mitigated construction noise levels will range from 7.9 to 11.2 dBA $L_{eq}$ and will not exceed the Caltrans *substantial* 12 dBA $L_{eq}$ noise level increase significance threshold. With the required 8 to 12-foot-high temporary noise barrier and the construction noise mitigation measures outlined below, the construction noise impacts are considered *less than significant*.

**TABLE 17: CONSTRUCTION NOISE LEVEL INCREASES**

| Receiver Location[1] | Highest Construction Noise Levels[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 55.0 | L1 | 47.2 | 55.7 | 8.5 | 12 | No |
| R2 | 56.6 | L1 | 47.2 | 57.1 | 9.9 | 12 | No |
| R3 | 50.7 | L2 | 43.6 | 51.5 | 7.9 | 12 | No |
| R4 | 53.6 | L2 | 43.6 | 54.0 | 10.4 | 12 | No |
| R5 | 61.6 | L3 | 47.2 | 61.8 | 14.6 | 12 | **Yes** |
| R6 | 63.6 | L3 | 47.2 | 63.7 | 16.5 | 12 | **Yes** |
| R7 | 56.8 | L3 | 47.2 | 57.3 | 10.1 | 12 | No |
| R8 | 59.2 | L4 | 45.7 | 59.4 | 13.7 | 12 | **Yes** |
| R9 | 55.9 | L5 | 42.6 | 56.1 | 13.5 | 12 | **Yes** |
| R10 | 60.5 | L5 | 42.6 | 60.6 | 18.0 | 12 | **Yes** |

[1] See Exhibit F for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 16.
[3] Ambient noise level measurement locations as shown on Exhibit C.
[4] Observed daytime ambient noise levels as shown on Table 12.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.
[7] Caltrans substantial noise level increase criteria.

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## EXHIBIT G: CONSTRUCTION NOISE MITIGATION MEASURES

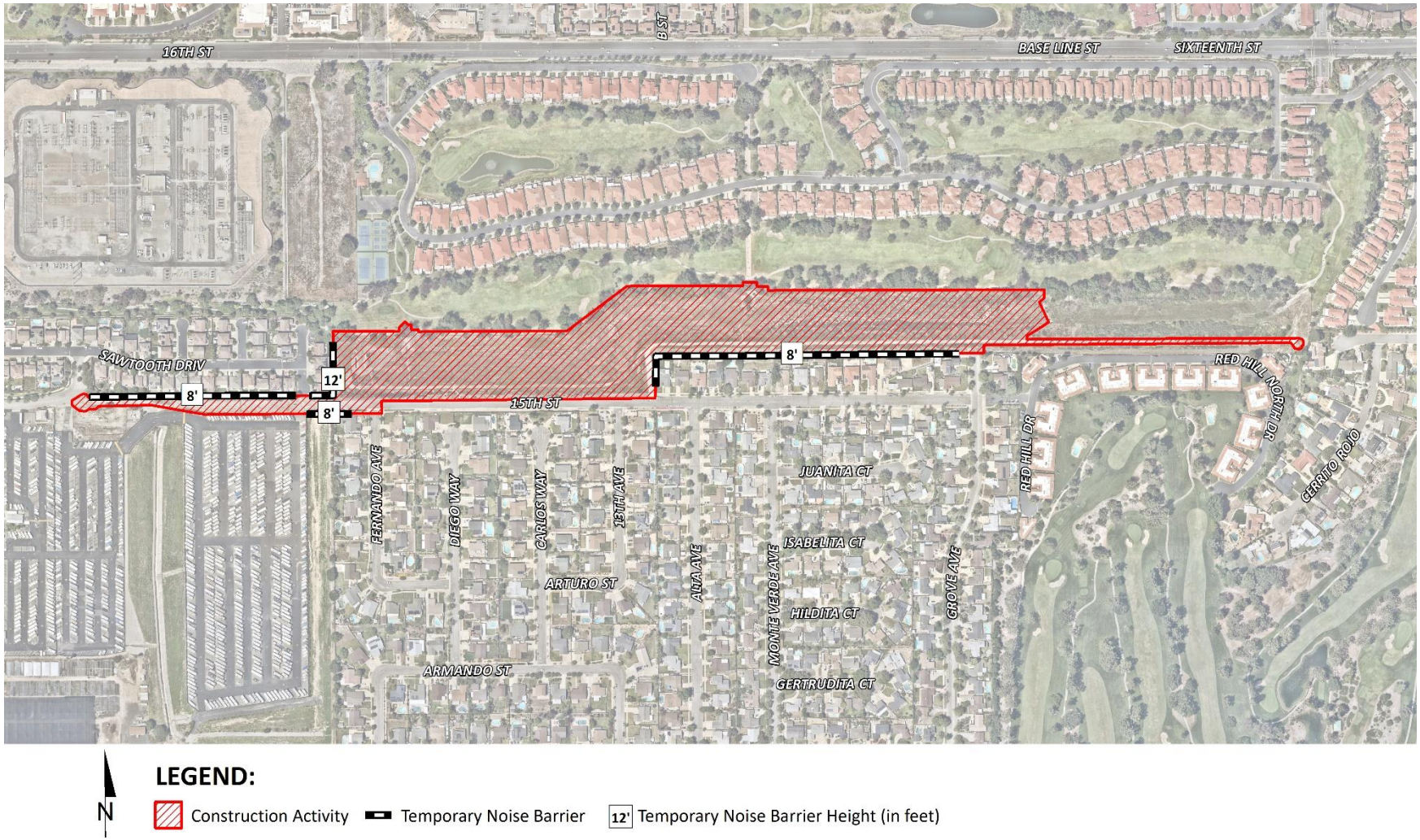

**TABLE 18: MITIGATED CONSTRUCTION NOISE LEVEL INCREASES**

| Receiver Location[1] | Highest Construction Noise Levels[2] | Measurement Location[3] | Reference Ambient Noise Levels[4] | Combined Project and Ambient[5] | Project Increase[6] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 55.0 | L1 | 47.2 | 55.7 | 8.5 | 12 | No |
| R2 | 56.6 | L1 | 47.2 | 57.1 | 9.9 | 12 | No |
| R3 | 50.7 | L2 | 43.6 | 51.5 | 7.9 | 12 | No |
| R4 | 53.6 | L2 | 43.6 | 54.0 | 10.4 | 12 | No |
| R5 | 55.3 | L3 | 47.2 | 55.9 | 8.7 | 12 | No |
| R6 | 58.1 | L3 | 47.2 | 58.4 | 11.2 | 12 | No |
| R7 | 56.8 | L3 | 47.2 | 57.3 | 10.1 | 12 | No |
| R8 | 56.6 | L4 | 45.7 | 56.9 | 11.2 | 12 | No |
| R9 | 53.3 | L5 | 42.6 | 53.7 | 11.1 | 12 | No |
| R10 | 52.2 | L5 | 42.6 | 52.7 | 10.1 | 12 | No |

[1] See Exhibit F for the receiver locations.
[2] Mitigated Project construction noise level calculations are included in H.
[3] Ambient noise level measurement locations as shown on Exhibit C.
[4] Observed daytime ambient noise levels as shown on Table 12.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.
[7] Caltrans substantial noise level increase criteria.

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## PROJECT CONSTRUCTION NOISE MITIGATION MEASURES

The following mitigation measures are required to reduce noise levels produced by the construction equipment.

MM-1 Install a minimum 8 to 12-foot-high temporary construction noise barrier as shown on Exhibit G. The noise control barriers must have a solid face from top to bottom. The noise control barriers must meet the minimum height and be constructed as follows:

- The temporary noise barriers shall provide a minimum transmission loss of 20 dBA (Federal Highway Administration, Noise Barrier Design Handbook). The noise barrier shall be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts.
- The noise barrier must be maintained, and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired.
- The noise control barrier and associated elements shall be completely removed, and the site appropriately restored upon the conclusion of the construction activity.

MM-2 All construction activities shall comply with City of Upland Section 9.40.100[M] limiting construction activity to the hours between 7:00 a.m. and 6:00 p.m.

MM-3 Construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards.

MM-4 All stationary construction equipment shall be placed in such a manner so that emitted noise is directed away from any sensitive receivers.

MM-5 Construction equipment staging areas shall be located at the greatest feasible distance between the staging area and the nearest sensitive receivers.

MM-6 The construction contractor shall limit equipment and material deliveries to the same hours specified for construction equipment for MM-2.

MM-7 Electrically powered air compressors and similar power tools shall be used, when feasible, in place of diesel equipment.

MM-8 No music or electronically reinforced speech from construction workers shall be allowed.

## CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. (10) Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (10) Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity.

To analyze vibration impacts originating from the operation and construction of the Villa Serena, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Upland does not identify specific vibration level limits and instead relies on the Federal Transit Administration (FTA) methodology (10) consistent with the City of Upland General Plan Final Program EIR. (17) The FTA *Transit Noise and Vibration Impact Assessment* methodology provides guidelines for the maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 90 VdB for industrial (workshop) use, 84 VdB for office use and 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep. (10)

### TYPICAL CONSTRUCTION VIBRATION IMPACTS

Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA) (10). However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 19. Based on the representative vibration levels presented for typical construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\ ft) - 30\log(D/25)$

**TABLE 19: VIBRATION SOURCE LEVELS FOR TYPICAL CONSTRUCTION EQUIPMENT**

| Equipment | Vibration Decibels (VdB) at 25 feet |
|---|---|
| Small bulldozer | 58 |
| Jackhammer | 79 |
| Loaded Trucks | 86 |
| Large bulldozer | 87 |

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 20 presents the expected typical construction equipment vibration levels at the nearest receiver locations. At distances ranging from 12 feet to 187 feet from typical Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 60.8 to 96.6 VdB and will exceed the FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable vibration criteria of 78 VdB for daytime residential uses at receivers located within 50 feet of the Project site boundary. The vibration analysis shows that the Project-related construction vibration impacts will be *potentially significant* during the typical construction activities at the Project site and mitigation is required.

**TABLE 20: TYPICAL CONSTRUCTION EQUIPMENT VIBRATION LEVELS**

| Receiver Location[1] | Distance to Construction Activity (Feet) | Receiver Vibration Levels (VdB)[2] | | | | | Threshold VdB[3] | Threshold Exceeded?[4] |
|---|---|---|---|---|---|---|---|---|
| | | Small Bulldozer | Jack-hammer | Loaded Trucks | Large Bulldozer | Highest Vibration Levels | | |
| R1 | 187' | 31.8 | 52.8 | 59.8 | 60.8 | 60.8 | 78 | No |
| R2 | 144' | 35.2 | 56.2 | 63.2 | 64.2 | 64.2 | 78 | No |
| R3 | 179' | 32.4 | 53.4 | 60.4 | 61.4 | 61.4 | 78 | No |
| R4 | 51' | 48.7 | 69.7 | 76.7 | 77.7 | 77.7 | 78 | No |
| R5 | 27' | 57.0 | 78.0 | 85.0 | 86.0 | 86.0 | 78 | **Yes** |
| R6 | 17' | 63.0 | 84.0 | 91.0 | 92.0 | 92.0 | 78 | **Yes** |
| R7 | 59' | 46.8 | 67.8 | 74.8 | 75.8 | 75.8 | 78 | No |
| R8 | 28' | 56.5 | 77.5 | 84.5 | 85.5 | 85.5 | 78 | **Yes** |
| R9 | 29' | 56.1 | 77.1 | 84.1 | 85.1 | 85.1 | 78 | **Yes** |
| R10 | 12' | 67.6 | 88.6 | 95.6 | 96.6 | 96.6 | 78 | **Yes** |

[1] Receiver locations are shown on Exhibit B.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 4.
[3] FTA Transit Noise and Vibration Impact Assessment maximum acceptable vibration criteria.
[4] Does the vibration level exceed the maximum acceptable vibration threshold?

Therefore, a 50-foot buffer setback mitigation measure is required which would restrict the use of large, loaded trucks, and heavy mobile equipment greater than 80,000 pounds, within 50-feet of occupied sensitive receiver locations represented by receiver locations R5, R6, R8, R9 and R10. Instead, small rubber-tired or alternative equipment, as well as soil compaction equipment shall be used during Project construction to reduce vibration effects on nearby structures and their occupants. Table 20 shows that with the 50-foot setback buffer, Project construction vibration levels will not exceed the 78 VdB construction vibration threshold for daytime residential uses. Therefore, the Project-related construction vibration impacts are considered *less than significant* with a 50-foot buffer setback mitigation measure during typical construction activities at the Project site. Moreover, the vibration levels reported at the sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

Mr. Robert D. Dalquest
City of Upland
October 1, 2024

## CONCLUSIONS

This Noise Assessment demonstrates that the noise and vibration levels associated with Villa Serena Project will satisfy the noise standards outlined in the City of Upland Plan and the significance criteria provided by Section XIII (a) of the CEAQ Environmental Checklist Form Appendix G. (1) Therefore, the Project-related noise and vibration impacts are considered *less than significant* with mitigation at the nearby noise-sensitive receiver locations. If you have any questions, please contact me directly at (949) 584-3148.

Respectfully submitted,

URBAN CROSSROADS, INC.






Bill Lawson, P.E., INCE
Principal

## REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G Environmental Checklist Form.* 2019.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
4. **Governor's Office of Planning and Research.** *State of California General Plan Guidlines.* 2017.
5. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
6. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
7. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
8. **Urban Crossroads, Inc.** *Upland Colonies Traffic Impact Analysis.* October 2022.
9. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
10. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
11. **City of Fontana.** *Zoning and Development Code, Section 30, Article V - Residential Zoning Districts, Division 6 - Performance Standards.*
12. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
13. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
14. **City of Upland.** *Municipal Code, Chapter 9.40 - Unnecessary Noise.*
15. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.
16. **California Department of Transportation.** *Traffic Noise Analysis Protocol.* April 2020.
17. **City of Upland.** *General Plan Final Program EIR.* September 2015.

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# APPENDIX A

# SUPERIOR COURT RULING

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Superior Court of California
County of San Bernardino
247 West Third Street, Dept. S26
San Bernardino, California 92415

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF SAN BERNARDINO
SAN BERNARDINO DISTRICT

SEP 13 2021

BY JESSICA MORALES, DEPUTY

**SUPERIOR COURT OF THE STATE OF CALIFORNIA**

**COUNTY OF SAN BERNARDINO, SAN BERNARDINO DISTRICT**

FRIENDS OF UPLAND WETLANDS,

Petitioner,

vs.

CITY OF UPLAND; AND DOES 11 through 100,

Respondent.

FH II, LLC; and DOES 101 through 1,000

Defendants and Real Parties in Interest

Case No.: CIVDS-2010521

RULING ON SUBMITTED MATTER:

PETITION FOR WRIT OF MANDATE GRANTED IN PART

Hearing Date: July 14, 2021
Dept: S-26, Judge David Cohn

*San Diego* (2019) 43 Cal.App.5th 404, 418, quoting *Benach v. County of Los Angeles* (2007) 149 Cal.App.4th 836, 852.) "Issues do not have a life of their own: if they are not raised or supported by argument or citation to authority, we consider the issues waived." (*Jones v. Superior Court* (1994) 26 Cal.App.4th 92, 96, cited in *Holden v. City of San Diego, supra,* at p. 418; *see also*, Cal. Rules of Court, rule 3.1113(a) [provides for waiver of all grounds not supported in the points and authorities accompanying a motion or opposition to a motion].)

FUW's failure to specify the reasons why the IS/MND is inadequate on this issue is fatal to this argument.

**F. The IS/MND Failed to Analyze the Noise Impacts of the Project Compared to the Ambient Noise Level, but Considered Only the Maximum Noise Threshold.**

FUW contends the IS/MND improperly relied on Upland's "exterior noise standard" and a federal vibration standard as thresholds of significance in analyzing the potentially significant noise impacts of the project. FUW's argument is unsupported.

The CEQA Guidelines define the "threshold of significance" as "an identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." (Guidelines, § 15064.7, subd. (a).) "'The lead agency has substantial discretion in determining the appropriate threshold of significance to evaluate the severity of a particular impact.' [Citation.]" (*Jensen, supra,* 23 Cal.App.5th at p. 885.)

Regarding noise impacts, the environmental checklist form in the Guidelines includes a series of questions to frame the analysis. (*See*, Guidelines Appendix G: Environmental Checklist Form, XIII, Noise.) The key question is whether the project will generate "a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standard established in the local general plan or noise ordinance, or applicable standard of other agencies." (Guidelines Appendix G: Environmental Checklist Form, XIII, Noise.)

The IS/MND identifies Upland Municipal Code Chapter 9.40, Unnecessary Noise, and Upland's General Plan Policies SAF-1.1 and SAF-1.3 as the basis for the thresholds of significance used in analyzing noise impacts of the project. (*See*, AR 156-159, 1384-1458.) Vibration level standards are not identified in the Upland General Plan or Municipal Code. As a result, the IS/MND adopted the U.S. Department of Transportation Federal Transit Administration ("FTA") guidelines for maximum-acceptable vibration criteria for different land uses. (AR 1411.)

The public agency's decision in choosing the threshold is presumed correct, and a petitioner bears the burden of proving that the threshold selected is legally inadequate. FUW does not suggest any alternatives to the thresholds of significance used by Upland and FH, nor do they point to any evidence in the record demonstrating that the selected thresholds are inadequate. Therefore, FUW has not met its burden of demonstrating the selected thresholds are legally inadequate.

Nonetheless, Guidelines section 15064, subdivision (b)(2), provides:

> When using a threshold, the lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant. Compliance with the threshold does not relieve a lead agency of the obligation to

consider substantial evidence indicating that the project's environmental effect may still be significant.

FUW argues that Upland failed to exercise "careful judgment" in analyzing the noise impacts. FUW contends the IS/MND failed to analyze the qualitative increase in existing ambient noise levels, and did not consider that "an activity which may not be significant in an urban area may be significant in a rural area." (Guidelines, § 15064, subd. (b).) According to FUW, the noise analysis should have started with the existing noise situation as the "baseline," not with Upland's noise standard as the "ceiling."

Lead agencies often use the CEQA checklist in conjunction with an analysis using quantitative limits on maximum allowed noise levels and on increases in the level of noise to determine whether noise impacts are significant. (*King & Gardiner Farms, LLC v. County of Kern* (2020) 45 Cal.App.5th 814, 883; *see also*, *Jensen, supra,* 23 Cal.App.5th 877 [negative declaration case].) Nevertheless, "[t]he noise questions in the checklist do not define what maximum level of noise, or increase in the level of noise, constitutes a significant impact." (2 Kostka & Zischke, *supra,* § 13.64A, citing to *King & Gardiner Farms, supra*, 45 Cal.App.5th at p. 884.)

Upland and FH contend that since they used the relevant provisions of the General Plan and Upland Municipal Code as the thresholds of significance, the noise impacts analysis is proper. But lead agencies do not have discretion to consider only maximum noise levels and ignore any increases in noise levels relative to existing conditions in the project area. (*King & Gardiner Farms, supra,* 45 Cal.App.5th at p. 887, quoting *Keep our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714, 732-733 [negative declaration case holding that increase in noise level must be considered, not just absolute noise level].) Here, there is substantial evidence

supporting a fair argument that Upland considered only the maximum threshold and did not qualitatively analyze the noise impacts.

In Upland's General Plan, Policy SAF-1.1 provides the "Exterior Noise Standards" and states: "For a single-family residential land use such as the Project, the *normally acceptable* exterior noise level standard is 60 A-weighted decibels (dBA) CNEL [Community Noise Equivalent Level]."[27] (AR 1409, 159.) Policy SAF-1.3 sets forth the "Interior Noise Standards" and "identifies an interior noise level standard of 45 dBA CNEL for new residential developments." (AR 1409.)

In the technical analysis (Appendix "H" to the IS/MND), the section discussing the construction noise standards states that section 9.40.040 of the UMC "identifies the maximum allowable noise levels at residential use based on the 55 dBA *base ambient noise level* standard plus 20 dBA, which equates to a 75 dBA $L_{max}$ noise level standard."[28] (AR 1410.) This assertion that the maximum allowable noise level is 75 dBA $L_{max}$ is misleading. The maximum exterior residential noise level above the base ambient noise level is set forth in UMC section 9.40.070, and it provides maximum duration periods for noise levels exceeding the base ambient noise level. The code section states that a noise level of 20 dBA above base ambient level is not permitted at

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[27] Policy SAF-1.1 "identifies the transportation-related exterior noise compatibility standards for different land uses in Table SAF-1 ...." [AR 1409.] The IS/MND states that "[t]he Community Noise Equivalent Level (CNEL) uses weighted averages of the intensity of a sound, with corrections for time of day, to represent a composite 24-hour noise level. [Upland] uses CNEL to represent their exterior and interior noise standards." [AR 159.]

[28] UMC sections 9.40.040 provides, "All ambient noise measurements shall commence at the base ambient levels in decibels within the respective times and zones as follows," and then establishes the base ambient noise level for residential land uses of 55 dBA during the hours of 7:00 a.m. to 10:00 p.m. [AR 1442.] The code section goes on to state, "Actual decibel measurements exceeding the above levels at the times and within the zones corresponding thereto shall be employed as the base ambient noise level referred to in this chapter. Otherwise, no ambient noise shall be deemed to be less than the above specified levels." [AR 1442.]

all, and the base ambient noise level is allowed for only thirty minutes per hour.[29] (AR 1443.)

The technical analysis of the noise impacts repeatedly seeks only to "satisfy the City of Upland 60 dBA CNEL exterior noise level standard for residential land use" or "satisfy the 45 dBA CNEL interior noise level standard." (AR 1391, 1392, 1419.) There is no discussion of the *actual* base ambient noise level in the areas surrounding the site and the increase in that noise level—only a discussion of the predicted absolute noise levels associated with the project. Therefore, in finding that the unmitigated exterior noise levels generated by on-site transportation "will range from 57.0 to 66.4 dBA CNEL," the technical analysis only contemplates mitigation that will result in an exterior noise level not in excess of 60 dBA CNEL. (AR 1419.)

Similarly, the technical analysis seems to view the 75 dBA $L_{max}$ noise level as the unqualified maximum threshold to be exceeded in determining whether unmitigated project-related construction noise levels are potentially significant. (AR 1392.) The technical analysis states that "the Project-related construction noise impacts [were] evaluated based on the maximum allowable noise level for residential uses of 75 dBA $L_{max}$." (AR 1410.) As a result, when the technical analysis determined that the unmitigated construction noise levels were expected to range from 61.3 to 83.3 dBA $L_{max}$, the formulation of a mitigation measure was based only on the 83.3 dBA $L_{max}$ noise level since that level exceeded the 75 dBA $L_{max}$ level. (AR 1430-1431.) Since the mitigated temporary construction noise level was determined to range between 64.7

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[29] The noise level of 15 dBA above base ambient level is allowed only for one minute per hour, 10 dBA above base ambient noise level is allowed only for five minutes per hour, and 5 dBA above base ambient noise level is allowed for only 15 minutes per hour. [AR 1443.]

and 74.1 dBA $L_{max}$, the IS/MND concluded that the mitigation would reduce the noise impact to a less than significant level. (AR 1431.) Again, there was no discussion of the *actual* base ambient noise level in the surrounding area and the projected increase in that noise level caused by the project.[30]

Contrary to Upland's and FH's argument, "conformity with the absolute or maximum noise level specified in a general plan does not prevent a fair argument from being made that the proposed project will generate environmentally significant noise impacts. [Citation.] ... '[T]he lead agency should consider both the increase in noise level and absolute noise level associated with a project.' [Citation.]" (*King & Gardiner Farms, LLC, supra,* 45 Cal.App.5th at p. 887, quoting *Keep our Mountains Quiet v. County of Santa Clara* (2015) 236 Cal.App.4th 714, 732-733 [negative declaration case holding that increase in noise level must be considered, not just absolute noise level]; *see also, Citizens for Responsible & Open Development v. City of Grand Terrace* (2008) 160 Cal.App.4th 1323, 1338.)

Therefore, there is substantial evidence in the record supporting a fair argument that Upland and FH failed to qualitatively analyze the noise impacts of the project.

**G. FUW's Traffic Impact Argument is Moot.**

The IS/MND concluded that the project will result in less than significant traffic impacts. FUW, however, argues there is substantial evidence supporting a fair argument that the project may result in traffic *safety* issues. FUW cites comments made

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[30] Contrary to Upland's and FH's assertion, residents submitted written comments during the public comment period regarding their concerns regarding the noise impacts from the project and project-related construction. (AR 3910-3911, 3915, 3923, 3925.) In responses, Upland and FH claimed "no significant traffic noise impact was determined to exceed established City standards" (AR 3916), and "[w]ith the implementation of mitigation and imposition of standard City conditions, project-related ... noise impacts were reduced to less than significant levels (below established thresholds)." (AR 3924, 3928.)

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# APPENDIX B

# OFF-SITE TRAFFIC NOISE ANALYSIS WORKSHEETS

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* n/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,900 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,651 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.74 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.50 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.46 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.3 | 66.5 | 64.7 | 58.6 | 67.3 | 67.9 |
| *Medium Trucks:* | 61.3 | 60.8 | 54.5 | 52.9 | 61.4 | 61.6 |
| *Heavy Trucks:* | 62.6 | 62.2 | 53.2 | 54.5 | 62.8 | 62.9 |
| *Vehicle Noise:* | 69.3 | 68.6 | 65.4 | 60.8 | 69.3 | 69.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 40 | 86 | 185 | 398 |
| *CNEL:* | 43 | 92 | 198 | 426 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* s/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,354 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,608 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.62 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.62 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.57 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.2 | 66.3 | 64.6 | 58.5 | 67.1 | 67.7 |
| *Medium Trucks:* | 61.2 | 60.7 | 54.4 | 52.8 | 61.3 | 61.5 |
| *Heavy Trucks:* | 62.5 | 62.1 | 53.1 | 54.3 | 62.7 | 62.8 |
| *Vehicle Noise:* | 69.2 | 68.5 | 65.2 | 60.7 | 69.2 | 69.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 39 | 84 | 182 | 391 |
| *CNEL:* | 42 | 90 | 194 | 419 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* n/o 14th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 19,427 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,535 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.42 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.82 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.77 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.0 | 66.1 | 64.4 | 58.3 | 66.9 | 67.5 |
| *Medium Trucks:* | 61.0 | 60.5 | 54.2 | 52.6 | 61.1 | 61.3 |
| *Heavy Trucks:* | 62.3 | 61.9 | 52.9 | 54.1 | 62.5 | 62.6 |
| *Vehicle Noise:* | 69.0 | 68.3 | 65.0 | 60.5 | 69.0 | 69.5 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 38 | 82 | 176 | 379 |
| *CNEL:* | 41 | 87 | 188 | 406 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* Campus Av.
*Road Segment:* s/o 14th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 16,608 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,312 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | -0.26 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -17.50 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -21.45 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 66.3 | 65.5 | 63.7 | 57.6 | 66.3 | 66.9 |
| *Medium Trucks:* | 60.3 | 59.8 | 53.5 | 51.9 | 60.4 | 60.6 |
| *Heavy Trucks:* | 61.6 | 61.2 | 52.2 | 53.5 | 61.8 | 61.9 |
| *Vehicle Noise:* | 68.3 | 67.6 | 64.4 | 59.8 | 68.3 | 68.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 34 | 74 | 158 | 341 |
| *CNEL:* | 37 | 79 | 170 | 366 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 16th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 22,614 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,787 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.57 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.67 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.63 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.1 | 68.2 | 66.5 | 60.4 | 69.0 | 69.6 |
| *Medium Trucks:* | 62.9 | 62.4 | 56.0 | 54.5 | 63.0 | 63.2 |
| *Heavy Trucks:* | 63.7 | 63.3 | 54.3 | 55.6 | 63.9 | 64.0 |
| *Vehicle Noise:* | 71.0 | 70.2 | 67.1 | 62.4 | 70.9 | 71.4 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 51 | 110 | 236 | 509 |
| *CNEL:* | 55 | 118 | 253 | 546 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 16th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 23,465 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,854 vehicles |
| *Vehicle Speed:* | 45 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 68.46 | 0.73 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 79.45 | -16.51 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 84.25 | -20.46 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 69.3 | 68.4 | 66.6 | 60.6 | 69.2 | 69.8 |
| *Medium Trucks:* | 63.1 | 62.6 | 56.2 | 54.7 | 63.1 | 63.4 |
| *Heavy Trucks:* | 63.9 | 63.5 | 54.5 | 55.7 | 64.1 | 64.2 |
| *Vehicle Noise:* | 71.1 | 70.4 | 67.2 | 62.6 | 71.1 | 71.6 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 52 | 112 | 242 | 522 |
| *CNEL:* | 56 | 121 | 260 | 559 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 2,870 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 227 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -7.31 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -24.54 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -28.50 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.4 | 57.6 | 55.8 | 49.7 | 58.4 | 59.0 |
| *Medium Trucks:* | 52.7 | 52.2 | 45.9 | 44.3 | 52.8 | 53.0 |
| *Heavy Trucks:* | 54.6 | 54.2 | 45.1 | 46.4 | 54.7 | 54.9 |
| *Vehicle Noise:* | 60.7 | 60.0 | 56.5 | 52.2 | 60.7 | 61.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 8 | 17 | 37 | 79 |
| *CNEL:* | 8 | 18 | 39 | 84 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 100 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 8 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -20.42 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -37.66 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -41.62 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 39.7 | 38.9 | 37.1 | 31.1 | 39.7 | 40.3 |
| *Medium Trucks:* | 34.6 | 34.1 | 27.8 | 26.2 | 34.7 | 34.9 |
| *Heavy Trucks:* | 37.8 | 37.4 | 28.4 | 29.7 | 38.0 | 38.1 |
| *Vehicle Noise:* | 42.7 | 42.0 | 38.1 | 34.2 | 42.7 | 43.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 0 | 1 | 2 | 5 |
| *CNEL:* | 1 | 1 | 2 | 5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 127 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 10 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -19.38 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -36.62 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -40.58 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 40.8 | 39.9 | 38.1 | 32.1 | 40.7 | 41.3 |
| *Medium Trucks:* | 35.7 | 35.2 | 28.8 | 27.3 | 35.7 | 36.0 |
| *Heavy Trucks:* | 38.9 | 38.5 | 29.4 | 30.7 | 39.0 | 39.2 |
| *Vehicle Noise:* | 43.7 | 43.0 | 39.1 | 35.2 | 43.7 | 44.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 1 | 3 | 6 |
| *CNEL:* | 1 | 1 | 3 | 6 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,581 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 283 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.34 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.58 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.54 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.4 | 58.5 | 56.8 | 50.7 | 59.3 | 59.9 |
| *Medium Trucks:* | 53.7 | 53.2 | 46.8 | 45.3 | 53.7 | 54.0 |
| *Heavy Trucks:* | 55.5 | 55.1 | 46.1 | 47.3 | 55.7 | 55.8 |
| *Vehicle Noise:* | 61.6 | 60.9 | 57.5 | 53.1 | 61.6 | 62.1 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 20 | 43 | 92 |
| *CNEL:* | 10 | 21 | 45 | 98 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* n/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 21,084 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,666 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.78 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.46 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.42 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.4 | 66.5 | 64.7 | 58.7 | 67.3 | 67.9 |
| *Medium Trucks:* | 61.4 | 60.9 | 54.5 | 53.0 | 61.4 | 61.7 |
| *Heavy Trucks:* | 62.7 | 62.3 | 53.3 | 54.5 | 62.9 | 63.0 |
| *Vehicle Noise:* | 69.4 | 68.7 | 65.4 | 60.8 | 69.4 | 69.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 40 | 86 | 186 | 400 |
| *CNEL:* | 43 | 92 | 199 | 429 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* Campus Av.
*Road Segment:* s/o 16th St.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 20,630 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,630 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 0.68 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.56 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.51 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.3 | 66.4 | 64.6 | 58.6 | 67.2 | 67.8 |
| *Medium Trucks:* | 61.3 | 60.8 | 54.4 | 52.9 | 61.3 | 61.6 |
| *Heavy Trucks:* | 62.6 | 62.2 | 53.2 | 54.4 | 62.8 | 62.9 |
| *Vehicle Noise:* | 69.3 | 68.6 | 65.3 | 60.8 | 69.3 | 69.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 39 | 85 | 183 | 395 |
| *CNEL:* | 42 | 91 | 196 | 422 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Campus Av.
Road Segment: n/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,733 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,559 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 0.49 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.75 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.71 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.1 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| Medium Trucks: | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| Heavy Trucks: | 62.4 | 62.0 | 53.0 | 54.2 | 62.6 | 62.7 |
| Vehicle Noise: | 69.1 | 68.4 | 65.1 | 60.6 | 69.1 | 69.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 38 | 83 | 178 | 383 |
| CNEL: | 41 | 88 | 190 | 410 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Campus Av.
Road Segment: s/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,730 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,322 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | -0.23 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -17.47 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -21.42 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.4 | 65.5 | 63.7 | 57.7 | 66.3 | 66.9 |
| Medium Trucks: | 60.4 | 59.9 | 53.5 | 52.0 | 60.4 | 60.7 |
| Heavy Trucks: | 61.7 | 61.3 | 52.2 | 53.5 | 61.9 | 62.0 |
| Vehicle Noise: | 68.4 | 67.7 | 64.4 | 59.8 | 68.4 | 68.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 34 | 74 | 159 | 343 |
| CNEL: | 37 | 79 | 171 | 367 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: 16th St.
Road Segment: w/o Campus Av.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,644 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,789 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.57 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.66 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.62 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.1 | 68.2 | 66.5 | 60.4 | 69.0 | 69.6 |
| Medium Trucks: | 62.9 | 62.4 | 56.1 | 54.5 | 63.0 | 63.2 |
| Heavy Trucks: | 63.7 | 63.3 | 54.3 | 55.6 | 63.9 | 64.0 |
| Vehicle Noise: | 71.0 | 70.2 | 67.1 | 62.4 | 71.0 | 71.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 51 | 110 | 236 | 509 |
| CNEL: | 55 | 118 | 254 | 546 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: 16th St.
Road Segment: e/o Campus Av.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,527 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,859 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.74 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.50 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.45 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.3 | 68.4 | 66.6 | 60.6 | 69.2 | 69.8 |
| Medium Trucks: | 63.1 | 62.6 | 56.2 | 54.7 | 63.1 | 63.4 |
| Heavy Trucks: | 63.9 | 63.5 | 54.5 | 55.7 | 64.1 | 64.2 |
| Vehicle Noise: | 71.1 | 70.4 | 67.2 | 62.6 | 71.1 | 71.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 52 | 113 | 243 | 522 |
| CNEL: | 56 | 121 | 260 | 560 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 2,900 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 229 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -7.26 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -24.50 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -28.45 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 58.5 | 57.6 | 55.8 | 49.8 | 58.4 | 59.0 |
| *Medium Trucks:* | 52.7 | 52.3 | 45.9 | 44.4 | 52.8 | 53.0 |
| *Heavy Trucks:* | 54.6 | 54.2 | 45.2 | 46.4 | 54.8 | 54.9 |
| *Vehicle Noise:* | 60.7 | 60.0 | 56.6 | 52.2 | 60.7 | 61.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 8 | 17 | 37 | 80 |
| *CNEL:* | 8 | 18 | 39 | 85 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 609 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 48 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -12.58 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -29.81 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -33.77 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 47.6 | 46.7 | 45.0 | 38.9 | 47.5 | 48.1 |
| *Medium Trucks:* | 42.5 | 42.0 | 35.6 | 34.1 | 42.5 | 42.8 |
| *Heavy Trucks:* | 45.7 | 45.3 | 36.3 | 37.5 | 45.9 | 46.0 |
| *Vehicle Noise:* | 50.5 | 49.8 | 45.9 | 42.0 | 50.5 | 50.9 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 2 | 4 | 8 | 17 |
| *CNEL:* | 2 | 4 | 8 | 18 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 219 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 17 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -17.02 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -34.26 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -38.21 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 43.2 | 42.3 | 40.5 | 34.5 | 43.1 | 43.7 |
| *Medium Trucks:* | 38.0 | 37.5 | 31.2 | 29.6 | 38.1 | 38.3 |
| *Heavy Trucks:* | 41.2 | 40.8 | 31.8 | 33.1 | 41.4 | 41.5 |
| *Vehicle Noise:* | 46.1 | 45.4 | 41.5 | 37.6 | 46.1 | 46.5 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 2 | 4 | 8 |
| *CNEL:* | 1 | 2 | 4 | 9 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* E+P
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,673 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 290 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.23 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.47 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.43 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.5 | 58.6 | 56.9 | 50.8 | 59.4 | 60.0 |
| *Medium Trucks:* | 53.8 | 53.3 | 46.9 | 45.4 | 53.8 | 54.1 |
| *Heavy Trucks:* | 55.6 | 55.2 | 46.2 | 47.4 | 55.8 | 55.9 |
| *Vehicle Noise:* | 61.7 | 61.1 | 57.6 | 53.2 | 61.8 | 62.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 20 | 43 | 93 |
| *CNEL:* | 10 | 21 | 46 | 99 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: n/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,885 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,808 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.13 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.11 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.06 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.8 | 65.1 | 59.0 | 67.6 | 68.3 |
| Medium Trucks: | 61.7 | 61.2 | 54.9 | 53.3 | 61.8 | 62.0 |
| Heavy Trucks: | 63.0 | 62.6 | 53.6 | 54.9 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.7 | 61.2 | 69.7 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 91 | 196 | 423 |
| CNEL: | 45 | 98 | 210 | 453 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: s/o 16th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,946 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,813 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.14 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.09 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.05 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.9 | 65.1 | 59.0 | 67.7 | 68.3 |
| Medium Trucks: | 61.7 | 61.2 | 54.9 | 53.3 | 61.8 | 62.0 |
| Heavy Trucks: | 63.1 | 62.7 | 53.6 | 54.9 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.8 | 61.2 | 69.8 | 70.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 91 | 197 | 424 |
| CNEL: | 45 | 98 | 210 | 453 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: n/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,284 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,760 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.02 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.22 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.18 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.6 | 66.7 | 65.0 | 58.9 | 67.5 | 68.1 |
| Medium Trucks: | 61.6 | 61.1 | 54.8 | 53.2 | 61.7 | 61.9 |
| Heavy Trucks: | 62.9 | 62.5 | 53.5 | 54.7 | 63.1 | 63.2 |
| Vehicle Noise: | 69.6 | 68.9 | 65.6 | 61.1 | 69.6 | 70.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 89 | 193 | 415 |
| CNEL: | 44 | 96 | 206 | 445 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: Campus Av.
Road Segment: s/o 14th St.
Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,613 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,549 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 0.46 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.78 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.73 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.0 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| Medium Trucks: | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| Heavy Trucks: | 62.4 | 62.0 | 52.9 | 54.2 | 62.5 | 62.7 |
| Vehicle Noise: | 69.1 | 68.4 | 65.1 | 60.5 | 69.1 | 69.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 38 | 82 | 177 | 381 |
| CNEL: | 41 | 88 | 190 | 408 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 16th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 24,318 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,921 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.88 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.35 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.31 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.4 | 68.5 | 66.8 | 60.7 | 69.3 | 70.0 |
| Medium Trucks: | 63.2 | 62.7 | 56.4 | 54.8 | 63.3 | 63.5 |
| Heavy Trucks: | 64.1 | 63.7 | 54.6 | 55.9 | 64.2 | 64.3 |
| Vehicle Noise: | 71.3 | 70.5 | 67.4 | 62.7 | 71.3 | 71.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 53 | 115 | 248 | 534 |
| CNEL: | 57 | 123 | 266 | 573 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 16th St.
Road Segment: e/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,221 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,992 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 1.04 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.20 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.15 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.6 | 68.7 | 66.9 | 60.9 | 69.5 | 70.1 |
| Medium Trucks: | 63.4 | 62.9 | 56.5 | 55.0 | 63.4 | 63.7 |
| Heavy Trucks: | 64.2 | 63.8 | 54.8 | 56.0 | 64.4 | 64.5 |
| Vehicle Noise: | 71.4 | 70.7 | 67.6 | 62.9 | 71.4 | 71.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 254 | 547 |
| CNEL: | 59 | 126 | 272 | 587 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 15th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 3,365 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 266 vehicles |
| Vehicle Speed: | 35 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 64.30 | -6.61 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 75.75 | -23.85 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 81.57 | -27.81 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 59.1 | 58.3 | 56.5 | 50.4 | 59.1 | 59.7 |
| Medium Trucks: | 53.4 | 52.9 | 46.5 | 45.0 | 53.5 | 53.7 |
| Heavy Trucks: | 55.2 | 54.8 | 45.8 | 47.1 | 55.4 | 55.5 |
| Vehicle Noise: | 61.4 | 60.7 | 57.2 | 52.9 | 61.4 | 61.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 9 | 19 | 41 | 88 |
| CNEL: | 9 | 20 | 44 | 94 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC
Road Name: 15th St.
Road Segment: e/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 105 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 8 vehicles |
| Vehicle Speed: | 25 mph |
| Near/Far Lane Distance: | 12 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 33.0 feet |
| Centerline Dist. to Observer: | 33.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 32.833 |
| Medium Trucks: | 32.562 |
| Heavy Trucks: | 32.589 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 58.73 | -20.21 | 2.64 | -1.20 | -4.52 | 0.000 | 0.000 |
| Medium Trucks: | 70.80 | -37.45 | 2.69 | -1.20 | -4.86 | 0.000 | 0.000 |
| Heavy Trucks: | 77.97 | -41.40 | 2.69 | -1.20 | -5.69 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 40.0 | 39.1 | 37.3 | 31.3 | 39.9 | 40.5 |
| Medium Trucks: | 34.8 | 34.4 | 28.0 | 26.4 | 34.9 | 35.1 |
| Heavy Trucks: | 38.1 | 37.7 | 28.6 | 29.9 | 38.2 | 38.4 |
| Vehicle Noise: | 42.9 | 42.2 | 38.3 | 34.4 | 42.9 | 43.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 1 | 1 | 2 | 5 |
| CNEL: | 1 | 1 | 3 | 5 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 135 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 11 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -19.13 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -36.37 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -40.32 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 41.0 | 40.2 | 38.4 | 32.3 | 41.0 | 41.6 |
| *Medium Trucks:* | 35.9 | 35.4 | 29.1 | 27.5 | 36.0 | 36.2 |
| *Heavy Trucks:* | 39.1 | 38.7 | 29.7 | 31.0 | 39.3 | 39.4 |
| *Vehicle Noise:* | 43.9 | 43.3 | 39.4 | 35.5 | 44.0 | 44.4 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 1 | 3 | 6 |
| *CNEL:* | 1 | 1 | 3 | 6 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 4,120 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 325 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -5.73 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -22.97 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -26.93 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 60.0 | 59.1 | 57.4 | 51.3 | 59.9 | 60.5 |
| *Medium Trucks:* | 54.3 | 53.8 | 47.4 | 45.9 | 54.3 | 54.6 |
| *Heavy Trucks:* | 56.1 | 55.7 | 46.7 | 47.9 | 56.3 | 56.4 |
| *Vehicle Noise:* | 62.2 | 61.6 | 58.1 | 53.7 | 62.3 | 62.7 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 10 | 22 | 47 | 101 |
| *CNEL:* | 11 | 23 | 50 | 107 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* Campus Av.
*Road Segment:* n/o 16th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 23,069 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,822 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 1.17 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.07 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.03 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.8 | 66.9 | 65.1 | 59.1 | 67.7 | 68.3 |
| *Medium Trucks:* | 61.8 | 61.3 | 54.9 | 53.4 | 61.8 | 62.1 |
| *Heavy Trucks:* | 63.1 | 62.7 | 53.6 | 54.9 | 63.2 | 63.4 |
| *Vehicle Noise:* | 69.8 | 69.1 | 65.8 | 61.2 | 69.8 | 70.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 43 | 92 | 197 | 425 |
| *CNEL:* | 46 | 98 | 211 | 455 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* Campus Av.
*Road Segment:* s/o 16th St.
*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 23,222 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 1,835 vehicles |
| *Vehicle Speed:* | 40 mph |
| *Near/Far Lane Distance:* | 36 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 44.0 feet |
| *Centerline Dist. to Observer:* | 44.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 40.460 |
| *Medium Trucks:* | 40.241 |
| *Heavy Trucks:* | 40.262 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 66.51 | 1.20 | 1.28 | -1.20 | *-4.61* | 0.000 | 0.000 |
| *Medium Trucks:* | 77.72 | -16.04 | 1.31 | -1.20 | *-4.87* | 0.000 | 0.000 |
| *Heavy Trucks:* | 82.99 | -20.00 | 1.31 | -1.20 | *-5.50* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 67.8 | 66.9 | 65.1 | 59.1 | 67.7 | 68.3 |
| *Medium Trucks:* | 61.8 | 61.3 | 54.9 | 53.4 | 61.9 | 62.1 |
| *Heavy Trucks:* | 63.1 | 62.7 | 53.7 | 54.9 | 63.3 | 63.4 |
| *Vehicle Noise:* | 69.8 | 69.1 | 65.8 | 61.3 | 69.8 | 70.2 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 43 | 92 | 198 | 427 |
| *CNEL:* | 46 | 98 | 212 | 457 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: n/o 14th St.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 22,590 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,785 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 1.08 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.16 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.12 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.8 | 65.0 | 59.0 | 67.6 | 68.2 |
| Medium Trucks: | 61.7 | 61.2 | 54.8 | 53.3 | 61.7 | 62.0 |
| Heavy Trucks: | 63.0 | 62.6 | 53.5 | 54.8 | 63.2 | 63.3 |
| Vehicle Noise: | 69.7 | 69.0 | 65.7 | 61.1 | 69.7 | 70.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 195 | 419 |
| CNEL: | 45 | 97 | 208 | 449 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: Campus Av.
Road Segment: s/o 14th St.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,735 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,559 vehicles |
| Vehicle Speed: | 40 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 66.51 | 0.49 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 77.72 | -16.75 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 82.99 | -20.71 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.1 | 66.2 | 64.4 | 58.4 | 67.0 | 67.6 |
| Medium Trucks: | 61.1 | 60.6 | 54.2 | 52.7 | 61.1 | 61.4 |
| Heavy Trucks: | 62.4 | 62.0 | 53.0 | 54.2 | 62.6 | 62.7 |
| Vehicle Noise: | 69.1 | 68.4 | 65.1 | 60.6 | 69.1 | 69.5 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 38 | 83 | 178 | 383 |
| CNEL: | 41 | 88 | 190 | 410 |

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 16th St.
Road Segment: w/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 24,348 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,924 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.89 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.35 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.30 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.4 | 68.6 | 66.8 | 60.7 | 69.4 | 70.0 |
| Medium Trucks: | 63.2 | 62.7 | 56.4 | 54.8 | 63.3 | 63.5 |
| Heavy Trucks: | 64.1 | 63.7 | 54.6 | 55.9 | 64.2 | 64.4 |
| Vehicle Noise: | 71.3 | 70.6 | 67.4 | 62.7 | 71.3 | 71.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 53 | 115 | 248 | 535 |
| CNEL: | 57 | 124 | 266 | 573 |

Sunday, December 4, 2022

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC+P
Road Name: 16th St.
Road Segment: e/o Campus Av.

Project Name: Upland Colonies
Job Number: 14319

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,283 vehicles |
| Peak Hour Percentage: | 7.90% |
| Peak Hour Volume: | 1,997 vehicles |
| Vehicle Speed: | 45 mph |
| Near/Far Lane Distance: | 36 feet |

**Site Data**

| | |
|---|---|
| **Barrier Height:** | **0.0 feet** |
| Barrier Type (0-Wall, 1-Berm): | 0.0 |
| Centerline Dist. to Barrier: | 44.0 feet |
| Centerline Dist. to Observer: | 44.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

| | |
|---|---|
| Autos: | 15 |
| Medium Trucks (2 Axles): | 15 |
| Heavy Trucks (3+ Axles): | 15 |

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 77.5% | 12.9% | 9.6% | 97.42% |
| Medium Trucks: | 84.8% | 4.9% | 10.3% | 1.84% |
| Heavy Trucks: | 86.5% | 2.7% | 10.8% | 0.74% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.006 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 40.460 |
| Medium Trucks: | 40.241 |
| Heavy Trucks: | 40.262 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 1.05 | 1.28 | -1.20 | -4.61 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.18 | 1.31 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.14 | 1.31 | -1.20 | -5.50 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 69.6 | 68.7 | 66.9 | 60.9 | 69.5 | 70.1 |
| Medium Trucks: | 63.4 | 62.9 | 56.5 | 55.0 | 63.4 | 63.7 |
| Heavy Trucks: | 64.2 | 63.8 | 54.8 | 56.0 | 64.4 | 64.5 |
| Vehicle Noise: | 71.4 | 70.7 | 67.6 | 62.9 | 71.4 | 71.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 254 | 548 |
| CNEL: | 59 | 127 | 273 | 588 |

Sunday, December 4, 2022

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* 15th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 3,395 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 268 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -6.57 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -23.81 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -27.77 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 59.2 | 58.3 | 56.5 | 50.5 | 59.1 | 59.7 |
| *Medium Trucks:* | 53.4 | 52.9 | 46.6 | 45.0 | 53.5 | 53.7 |
| *Heavy Trucks:* | 55.3 | 54.9 | 45.9 | 47.1 | 55.5 | 55.6 |
| *Vehicle Noise:* | 61.4 | 60.7 | 57.3 | 52.9 | 61.4 | 61.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 9 | 19 | 41 | 88 |
| *CNEL:* | 9 | 20 | 44 | 94 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* 15th St.
*Road Segment:* e/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 614 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 49 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -12.54 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -29.78 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -33.73 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 47.6 | 46.8 | 45.0 | 38.9 | 47.6 | 48.2 |
| *Medium Trucks:* | 42.5 | 42.0 | 35.7 | 34.1 | 42.6 | 42.8 |
| *Heavy Trucks:* | 45.7 | 45.3 | 36.3 | 37.5 | 45.9 | 46.0 |
| *Vehicle Noise:* | 50.5 | 49.9 | 46.0 | 42.1 | 50.6 | 51.0 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 2 | 4 | 8 | 17 |
| *CNEL:* | 2 | 4 | 8 | 18 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* 15th St.
*Road Segment:* w/o Grove Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 227 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 18 vehicles |
| *Vehicle Speed:* | 25 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 58.73 | -16.87 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 70.80 | -34.10 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 77.97 | -38.06 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 43.3 | 42.4 | 40.7 | 34.6 | 43.2 | 43.8 |
| *Medium Trucks:* | 38.2 | 37.7 | 31.3 | 29.8 | 38.3 | 38.5 |
| *Heavy Trucks:* | 41.4 | 41.0 | 32.0 | 33.2 | 41.6 | 41.7 |
| *Vehicle Noise:* | 46.2 | 45.6 | 41.6 | 37.7 | 46.2 | 46.6 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 1 | 2 | 4 | 9 |
| *CNEL:* | 1 | 2 | 4 | 9 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

*Scenario:* OYC+P
*Road Name:* 14th St.
*Road Segment:* w/o Campus Av.

*Project Name:* Upland Colonies
*Job Number:* 14319

### SITE SPECIFIC INPUT DATA

***Highway Data***

| | |
|---|---|
| *Average Daily Traffic (Adt):* | 4,212 vehicles |
| *Peak Hour Percentage:* | 7.90% |
| *Peak Hour Volume:* | 333 vehicles |
| *Vehicle Speed:* | 35 mph |
| *Near/Far Lane Distance:* | 12 feet |

***Site Data***

| | |
|---|---|
| ***Barrier Height:*** | **0.0 feet** |
| *Barrier Type (0-Wall, 1-Berm):* | 0.0 |
| *Centerline Dist. to Barrier:* | 33.0 feet |
| *Centerline Dist. to Observer:* | 33.0 feet |
| *Barrier Distance to Observer:* | 0.0 feet |
| *Observer Height (Above Pad):* | 5.0 feet |
| *Pad Elevation:* | 0.0 feet |
| *Road Elevation:* | 0.0 feet |
| *Road Grade:* | 0.0% |
| *Left View:* | -90.0 degrees |
| *Right View:* | 90.0 degrees |

### NOISE MODEL INPUTS

***Site Conditions (Hard = 10, Soft = 15)***

| | |
|---|---|
| *Autos:* | 15 |
| *Medium Trucks (2 Axles):* | 15 |
| *Heavy Trucks (3+ Axles):* | 15 |

***Vehicle Mix***

| *VehicleType* | *Day* | *Evening* | *Night* | *Daily* |
|---|---|---|---|---|
| *Autos:* | 77.5% | 12.9% | 9.6% | 97.42% |
| *Medium Trucks:* | 84.8% | 4.9% | 10.3% | 1.84% |
| *Heavy Trucks:* | 86.5% | 2.7% | 10.8% | 0.74% |

***Noise Source Elevations (in feet)***

| | | | |
|---|---|---|---|
| *Autos:* | 0.000 | | |
| *Medium Trucks:* | 2.297 | | |
| *Heavy Trucks:* | 8.006 | *Grade Adjustment:* | 0.0 |

***Lane Equivalent Distance (in feet)***

| | |
|---|---|
| *Autos:* | 32.833 |
| *Medium Trucks:* | 32.562 |
| *Heavy Trucks:* | 32.589 |

***FHWA Noise Model Calculations***

| *VehicleType* | *REMEL* | *Traffic Flow* | *Distance* | *Finite Road* | *Fresnel* | *Barrier Atten* | *Berm Atten* |
|---|---|---|---|---|---|---|---|
| *Autos:* | 64.30 | -5.64 | 2.64 | -1.20 | *-4.52* | 0.000 | 0.000 |
| *Medium Trucks:* | 75.75 | -22.88 | 2.69 | -1.20 | *-4.86* | 0.000 | 0.000 |
| *Heavy Trucks:* | 81.57 | -26.83 | 2.69 | -1.20 | *-5.69* | 0.000 | 0.000 |

***Unmitigated Noise Levels (without Topo and barrier attenuation)***

| *VehicleType* | *Leq Peak Hour* | *Leq Day* | *Leq Evening* | *Leq Night* | *Ldn* | *CNEL* |
|---|---|---|---|---|---|---|
| *Autos:* | 60.1 | 59.2 | 57.5 | 51.4 | 60.0 | 60.6 |
| *Medium Trucks:* | 54.4 | 53.9 | 47.5 | 46.0 | 54.4 | 54.7 |
| *Heavy Trucks:* | 56.2 | 55.8 | 46.8 | 48.0 | 56.4 | 56.5 |
| *Vehicle Noise:* | 62.3 | 61.7 | 58.2 | 53.8 | 62.4 | 62.8 |

***Centerline Distance to Noise Contour (in feet)***

| | *70 dBA* | *65 dBA* | *60 dBA* | *55 dBA* |
|---|---|---|---|---|
| *Ldn:* | 10 | 22 | 47 | 102 |
| *CNEL:* | 11 | 23 | 51 | 109 |

# APPENDIX C

# STUDY AREA PHOTOS

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# JN: 14319 Study Area Photos



**L1-E**
**34, 7' 8.710000"117, 38' 9.850000"**



**L1-N**
**34, 7' 8.580000"117, 38' 9.910000"**



**L1-S**
**34, 7' 7.810000"117, 38' 10.460000"**



**L1-W**
**34, 7' 8.700000"117, 38' 9.850000"**



**L2-E**
**34, 7' 7.090000"117, 37' 28.570000"**



**L2-N**
**34, 7' 7.150000"117, 37' 28.540000"**

# JN: 14319 Study Area Photos



**L2-S**
**34, 7' 7.130000"117, 37' 28.540000"**



**L2-W**
**34, 7' 7.080000"117, 37' 28.570000"**



**L3-E**
**34, 7' 5.020000"117, 37' 58.560000"**



**L3-N**
**34, 7' 4.940000"117, 37' 58.590000"**



**L3-S**
**34, 7' 4.940000"117, 37' 58.590000"**



**L3-W**
**34, 7' 5.010000"117, 37' 58.590000"**

# JN: 14319 Study Area Photos



L4-E
34, 7' 4.280000"117, 38' 11.200000"



L4-N
34, 7' 4.320000"117, 38' 11.200000"



L4-S
34, 7' 4.280000"117, 38' 11.200000"



L4-W
34, 7' 4.260000"117, 38' 11.170000"



L5-E
34, 7' 5.010000"117, 38' 12.460000"



L5-N
34, 7' 5.050000"117, 38' 12.570000"

# JN: 14319 Study Area Photos



**L5-S**
**34, 7' 5.020000"117, 38' 12.520000"**



**L5-W**
**34, 7' 4.990000"117, 38' 12.490000"**

# APPENDIX D

# NOISE LEVEL MEASUREMENT WORKSHEETS

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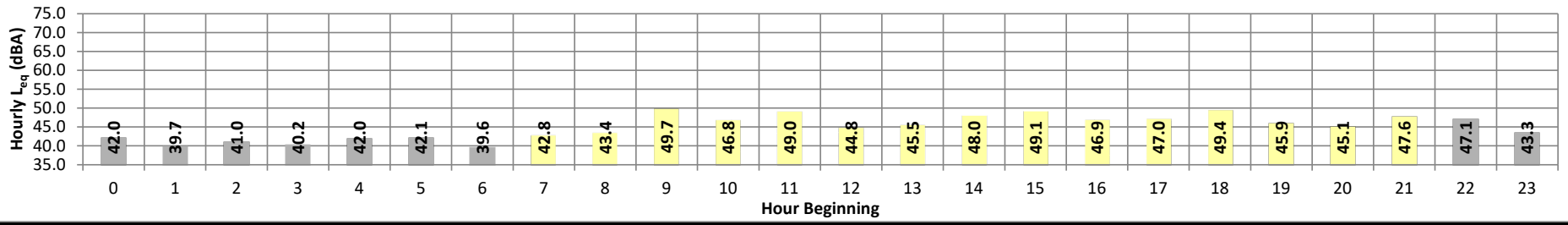
# 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L1 - Located north of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1168 Upland Hills Drive South. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 42.0 | 58.3 | 44.9 | 57.6 | 56.3 | 53.2 | 52.0 | 49.4 | 47.0 | 45.3 | 45.1 | 45.0 | 42.0 | 10.0 | 52.0 |
| | 1 | 39.7 | 44.5 | 37.1 | 44.1 | 43.7 | 42.7 | 42.1 | 40.3 | 39.0 | 37.6 | 37.4 | 37.2 | 39.7 | 10.0 | 49.7 |
| | 2 | 41.0 | 47.0 | 37.4 | 46.7 | 46.3 | 45.2 | 44.5 | 41.6 | 39.5 | 38.0 | 37.7 | 37.5 | 41.0 | 10.0 | 51.0 |
| | 3 | 40.2 | 49.7 | 36.0 | 49.0 | 47.8 | 44.8 | 43.8 | 39.6 | 38.2 | 36.5 | 36.3 | 36.1 | 40.2 | 10.0 | 50.2 |
| | 4 | 42.0 | 51.8 | 37.4 | 51.3 | 50.5 | 47.5 | 45.6 | 41.0 | 39.3 | 37.9 | 37.7 | 37.4 | 42.0 | 10.0 | 52.0 |
| | 5 | 42.1 | 50.1 | 38.2 | 49.4 | 48.6 | 46.4 | 45.2 | 42.3 | 40.5 | 38.7 | 38.5 | 38.3 | 42.1 | 10.0 | 52.1 |
| | 6 | 39.6 | 46.4 | 36.0 | 46.0 | 45.5 | 44.4 | 43.4 | 39.7 | 37.9 | 36.6 | 36.4 | 36.1 | 39.6 | 10.0 | 49.6 |
| Day | 7 | 42.8 | 51.3 | 37.6 | 50.5 | 49.8 | 47.8 | 46.4 | 42.9 | 40.8 | 38.6 | 38.2 | 37.8 | 42.8 | 0.0 | 42.8 |
| | 8 | 43.4 | 50.2 | 40.1 | 49.6 | 49.0 | 47.3 | 46.2 | 43.7 | 42.3 | 40.8 | 40.6 | 40.2 | 43.4 | 0.0 | 43.4 |
| | 9 | 49.7 | 55.1 | 42.2 | 54.7 | 54.4 | 53.9 | 53.4 | 50.7 | 48.9 | 43.8 | 43.2 | 42.4 | 49.7 | 0.0 | 49.7 |
| | 10 | 46.8 | 55.3 | 41.6 | 54.8 | 54.1 | 52.2 | 50.9 | 46.7 | 44.2 | 42.4 | 42.1 | 41.7 | 46.8 | 0.0 | 46.8 |
| | 11 | 49.0 | 60.7 | 41.2 | 60.1 | 59.2 | 55.7 | 53.2 | 47.0 | 43.9 | 41.9 | 41.7 | 41.4 | 49.0 | 0.0 | 49.0 |
| | 12 | 44.8 | 50.0 | 41.9 | 49.7 | 49.2 | 48.3 | 47.6 | 45.2 | 43.8 | 42.4 | 42.2 | 42.0 | 44.8 | 0.0 | 44.8 |
| | 13 | 45.5 | 53.5 | 41.3 | 52.4 | 51.5 | 49.8 | 48.9 | 45.7 | 44.0 | 42.1 | 41.8 | 41.5 | 45.5 | 0.0 | 45.5 |
| | 14 | 48.0 | 57.1 | 43.8 | 56.6 | 55.9 | 53.7 | 51.9 | 47.2 | 45.4 | 44.3 | 44.1 | 43.9 | 48.0 | 0.0 | 48.0 |
| | 15 | 49.1 | 57.7 | 45.1 | 57.4 | 56.7 | 54.3 | 52.5 | 48.4 | 47.2 | 45.7 | 45.5 | 45.2 | 49.1 | 0.0 | 49.1 |
| | 16 | 46.9 | 53.5 | 43.7 | 53.1 | 52.5 | 50.8 | 49.6 | 47.0 | 45.8 | 44.4 | 44.1 | 43.8 | 46.9 | 0.0 | 46.9 |
| | 17 | 47.0 | 53.8 | 44.2 | 53.3 | 52.6 | 50.9 | 49.7 | 47.1 | 45.9 | 44.8 | 44.6 | 44.4 | 47.0 | 0.0 | 47.0 |
| | 18 | 49.4 | 54.1 | 46.4 | 53.7 | 53.3 | 52.5 | 51.9 | 50.1 | 48.8 | 47.0 | 46.8 | 46.5 | 49.4 | 0.0 | 49.4 |
| | 19 | 45.9 | 51.7 | 42.6 | 51.1 | 50.7 | 49.4 | 48.6 | 46.3 | 45.0 | 43.4 | 43.1 | 42.7 | 45.9 | 5.0 | 50.9 |
| | 20 | 45.1 | 51.3 | 42.6 | 50.5 | 49.6 | 48.0 | 47.0 | 45.4 | 44.4 | 43.3 | 43.1 | 42.8 | 45.1 | 5.0 | 50.1 |
| | 21 | 47.6 | 52.8 | 45.0 | 52.5 | 52.0 | 51.1 | 50.4 | 47.8 | 46.7 | 45.6 | 45.4 | 45.2 | 47.6 | 5.0 | 52.6 |
| Night | 22 | 47.1 | 53.0 | 43.5 | 52.4 | 51.9 | 50.7 | 49.9 | 47.8 | 45.9 | 44.1 | 43.8 | 43.6 | 47.1 | 10.0 | 57.1 |
| | 23 | 43.3 | 49.0 | 39.8 | 48.4 | 48.0 | 47.2 | 46.6 | 44.3 | 41.8 | 40.5 | 40.2 | 39.9 | 43.3 | 10.0 | 53.3 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.8 | 50.0 | 37.6 | 49.6 | 49.0 | 47.3 | 46.2 | 42.9 | 40.8 | 38.6 | 38.2 | 37.8 |
| | Max | 49.7 | 60.7 | 46.4 | 60.1 | 59.2 | 55.7 | 53.4 | 50.7 | 48.9 | 47.0 | 46.8 | 46.5 |
| Energy Average | | 47.2 | Average: | | 53.3 | 52.7 | 51.0 | 49.9 | 46.7 | 45.1 | 43.4 | 43.1 | 42.8 |
| Night | Min | 39.6 | 44.5 | 36.0 | 44.1 | 43.7 | 42.7 | 42.1 | 39.6 | 37.9 | 36.5 | 36.3 | 36.1 |
| | Max | 47.1 | 58.3 | 44.9 | 57.6 | 56.3 | 53.2 | 52.0 | 49.4 | 47.0 | 45.3 | 45.1 | 45.0 |
| Energy Average | | 42.5 | Average: | | 49.4 | 48.7 | 46.9 | 45.9 | 42.9 | 41.0 | 39.5 | 39.2 | 39.0 |

| 24-Hour | $L_{eq}$ (dBA) Daytime (7am-10pm) | Nighttime (10pm-7am) |
|---|---|---|
| 46.0 | 47.2 | 42.5 |



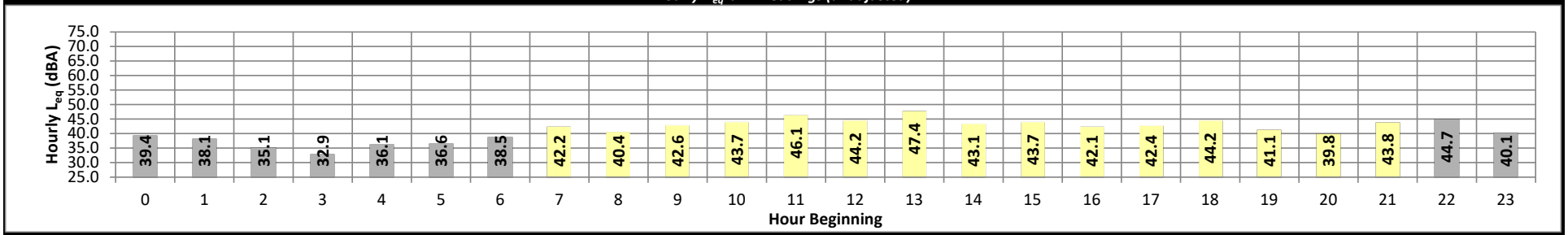
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L2 - Located east of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 8269 Calle Del Prado. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 39.4 | 44.4 | 36.0 | 43.9 | 43.5 | 42.6 | 42.1 | 40.1 | 38.6 | 36.7 | 36.4 | 36.1 | 39.4 | 10.0 | 49.4 |
| | 1 | 38.1 | 42.7 | 35.8 | 42.3 | 41.9 | 41.1 | 40.3 | 38.7 | 37.4 | 36.1 | 36.0 | 35.9 | 38.1 | 10.0 | 48.1 |
| | 2 | 35.1 | 38.6 | 33.4 | 38.3 | 37.9 | 37.3 | 36.8 | 35.4 | 34.7 | 33.7 | 33.6 | 33.4 | 35.1 | 10.0 | 45.1 |
| | 3 | 32.9 | 36.6 | 31.4 | 36.3 | 35.8 | 35.3 | 34.8 | 33.2 | 32.3 | 31.6 | 31.5 | 31.5 | 32.9 | 10.0 | 42.9 |
| | 4 | 36.1 | 40.5 | 34.3 | 40.2 | 40.0 | 39.2 | 38.3 | 36.4 | 35.3 | 34.5 | 34.4 | 34.3 | 36.1 | 10.0 | 46.1 |
| | 5 | 36.6 | 42.0 | 33.0 | 41.4 | 40.8 | 39.9 | 39.3 | 37.2 | 35.7 | 33.8 | 33.4 | 33.1 | 36.6 | 10.0 | 46.6 |
| | 6 | 38.5 | 49.0 | 33.6 | 47.4 | 46.0 | 43.4 | 42.1 | 38.2 | 36.2 | 34.3 | 34.0 | 33.7 | 38.5 | 10.0 | 48.5 |
| Day | 7 | 42.2 | 47.2 | 38.6 | 46.8 | 46.4 | 45.6 | 45.2 | 43.0 | 41.2 | 39.5 | 39.2 | 38.7 | 42.2 | 0.0 | 42.2 |
| | 8 | 40.4 | 48.1 | 36.1 | 47.4 | 46.8 | 45.1 | 43.9 | 40.6 | 38.6 | 37.1 | 36.7 | 36.3 | 40.4 | 0.0 | 40.4 |
| | 9 | 42.6 | 51.6 | 36.4 | 50.8 | 50.2 | 47.9 | 46.6 | 42.6 | 40.3 | 37.4 | 37.0 | 36.6 | 42.6 | 0.0 | 42.6 |
| | 10 | 43.7 | 53.8 | 36.9 | 52.3 | 50.9 | 48.7 | 47.6 | 43.9 | 41.3 | 38.3 | 37.8 | 37.1 | 43.7 | 0.0 | 43.7 |
| | 11 | 46.1 | 55.7 | 37.9 | 54.2 | 53.2 | 51.5 | 50.6 | 46.2 | 43.7 | 39.9 | 39.2 | 38.3 | 46.1 | 0.0 | 46.1 |
| | 12 | 44.2 | 54.7 | 39.4 | 54.2 | 53.8 | 52.5 | 51.7 | 48.9 | 45.9 | 40.6 | 40.3 | 39.7 | 44.2 | 0.0 | 44.2 |
| | 13 | 47.4 | 55.4 | 43.2 | 55.2 | 54.9 | 54.3 | 53.9 | 51.7 | 49.2 | 45.0 | 44.4 | 43.4 | 47.4 | 0.0 | 47.4 |
| | 14 | 43.1 | 50.9 | 38.3 | 50.6 | 50.0 | 47.9 | 46.8 | 43.3 | 40.7 | 38.9 | 38.7 | 38.4 | 43.1 | 0.0 | 43.1 |
| | 15 | 43.7 | 51.7 | 39.2 | 50.7 | 49.9 | 48.3 | 47.0 | 44.3 | 42.0 | 39.9 | 39.6 | 39.3 | 43.7 | 0.0 | 43.7 |
| | 16 | 42.1 | 48.9 | 38.2 | 48.1 | 47.6 | 46.2 | 45.3 | 42.9 | 40.7 | 38.8 | 38.6 | 38.4 | 42.1 | 0.0 | 42.1 |
| | 17 | 42.4 | 50.0 | 39.1 | 49.3 | 48.7 | 46.8 | 45.1 | 42.5 | 41.2 | 39.7 | 39.5 | 39.3 | 42.4 | 0.0 | 42.4 |
| | 18 | 44.2 | 50.2 | 40.2 | 49.7 | 49.4 | 48.2 | 47.4 | 44.9 | 43.1 | 41.0 | 40.7 | 40.4 | 44.2 | 0.0 | 44.2 |
| | 19 | 41.1 | 48.9 | 36.8 | 47.5 | 46.5 | 45.0 | 44.2 | 41.8 | 39.9 | 37.7 | 37.3 | 37.0 | 41.1 | 5.0 | 46.1 |
| | 20 | 39.8 | 44.5 | 38.2 | 43.9 | 43.3 | 42.0 | 41.4 | 40.1 | 39.4 | 38.6 | 38.5 | 38.2 | 39.8 | 5.0 | 44.8 |
| | 21 | 43.8 | 47.8 | 42.1 | 47.3 | 46.8 | 45.8 | 45.3 | 44.1 | 43.4 | 42.5 | 42.4 | 42.2 | 43.8 | 5.0 | 48.8 |
| Night | 22 | 44.7 | 50.1 | 41.3 | 49.5 | 49.0 | 48.1 | 47.6 | 45.7 | 43.9 | 41.7 | 41.5 | 41.4 | 44.7 | 10.0 | 54.7 |
| | 23 | 40.1 | 47.7 | 36.9 | 46.6 | 45.7 | 44.1 | 43.1 | 40.4 | 38.7 | 37.4 | 37.2 | 37.0 | 40.1 | 10.0 | 50.1 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 39.8 | 44.5 | 36.1 | 43.9 | 43.3 | 42.0 | 41.4 | 40.1 | 38.6 | 37.1 | 36.7 | 36.3 |
| | Max | 47.4 | 55.7 | 43.2 | 55.2 | 54.9 | 54.3 | 53.9 | 51.7 | 49.2 | 45.0 | 44.4 | 43.4 |
| Energy Average | | 43.6 | Average: | | 49.9 | 49.2 | 47.7 | 46.8 | 44.0 | 42.0 | 39.7 | 39.3 | 38.9 |
| Night | Min | 32.9 | 36.6 | 31.4 | 36.3 | 35.8 | 35.3 | 34.8 | 33.2 | 32.3 | 31.6 | 31.5 | 31.5 |
| | Max | 44.7 | 50.1 | 41.3 | 49.5 | 49.0 | 48.1 | 47.6 | 45.7 | 43.9 | 41.7 | 41.5 | 41.4 |
| Energy Average | | 39.3 | Average: | | 42.9 | 42.3 | 41.2 | 40.5 | 38.4 | 37.0 | 35.5 | 35.3 | 35.1 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime (7am-10pm) | Nighttime (10pm-7am) |
| **42.4** | **43.6** | **39.3** |



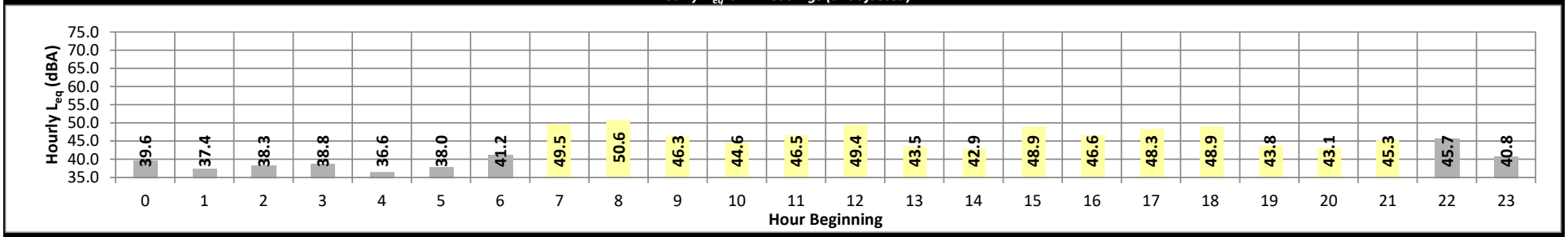
URBAN CROSSROADS

# 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L3 - Located south of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1335 East 15th Street. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 39.6 | 44.6 | 36.2 | 44.1 | 43.6 | 42.7 | 42.2 | 40.5 | 38.9 | 37.0 | 36.7 | 36.4 | 39.6 | 10.0 | 49.6 |
| | 1 | 37.4 | 40.5 | 35.1 | 40.2 | 39.9 | 39.4 | 39.0 | 38.0 | 37.1 | 35.6 | 35.5 | 35.2 | 37.4 | 10.0 | 47.4 |
| | 2 | 38.3 | 42.8 | 35.9 | 42.4 | 41.9 | 41.0 | 40.6 | 38.8 | 37.6 | 36.4 | 36.2 | 36.0 | 38.3 | 10.0 | 48.3 |
| | 3 | 38.8 | 49.8 | 32.4 | 49.4 | 48.8 | 47.0 | 43.8 | 35.2 | 33.6 | 32.7 | 32.6 | 32.5 | 38.8 | 10.0 | 48.8 |
| | 4 | 36.6 | 44.3 | 33.1 | 43.9 | 43.2 | 40.8 | 39.4 | 36.7 | 34.9 | 33.9 | 33.7 | 33.5 | 36.6 | 10.0 | 46.6 |
| | 5 | 38.0 | 44.5 | 34.9 | 43.9 | 43.3 | 41.9 | 41.0 | 38.1 | 36.7 | 35.5 | 35.3 | 35.0 | 38.0 | 10.0 | 48.0 |
| | 6 | 41.2 | 52.2 | 35.1 | 51.7 | 50.7 | 48.7 | 46.3 | 38.3 | 36.8 | 35.6 | 35.4 | 35.2 | 41.2 | 10.0 | 51.2 |
| Day | 7 | 49.5 | 59.9 | 36.4 | 58.9 | 58.4 | 56.1 | 53.9 | 49.7 | 45.3 | 39.1 | 38.0 | 36.8 | 49.5 | 0.0 | 49.5 |
| | 8 | 50.6 | 62.3 | 37.2 | 61.1 | 60.1 | 57.9 | 55.8 | 50.1 | 42.8 | 38.4 | 37.9 | 37.4 | 50.6 | 0.0 | 50.6 |
| | 9 | 46.3 | 56.8 | 38.4 | 56.3 | 55.4 | 53.6 | 51.5 | 44.4 | 42.0 | 39.3 | 38.9 | 38.5 | 46.3 | 0.0 | 46.3 |
| | 10 | 44.6 | 52.9 | 40.6 | 52.3 | 51.7 | 50.3 | 48.7 | 43.5 | 42.5 | 41.2 | 41.0 | 40.7 | 44.6 | 0.0 | 44.6 |
| | 11 | 46.5 | 57.6 | 38.4 | 56.8 | 56.1 | 54.3 | 52.4 | 43.4 | 41.0 | 39.0 | 38.8 | 38.5 | 46.5 | 0.0 | 46.5 |
| | 12 | 49.4 | 62.7 | 38.6 | 62.1 | 61.1 | 57.0 | 53.1 | 45.5 | 40.7 | 39.2 | 39.0 | 38.7 | 49.4 | 0.0 | 49.4 |
| | 13 | 43.5 | 53.8 | 38.1 | 53.2 | 52.6 | 50.1 | 47.7 | 42.2 | 39.9 | 38.6 | 38.4 | 38.3 | 43.5 | 0.0 | 43.5 |
| | 14 | 42.9 | 67.4 | 40.5 | 66.2 | 65.5 | 64.2 | 63.4 | 59.1 | 54.8 | 41.0 | 40.9 | 40.6 | 42.9 | 0.0 | 42.9 |
| | 15 | 48.9 | 56.7 | 41.5 | 56.2 | 55.5 | 54.0 | 52.5 | 50.0 | 46.7 | 42.7 | 42.0 | 41.6 | 48.9 | 0.0 | 48.9 |
| | 16 | 46.6 | 54.9 | 41.0 | 54.0 | 53.2 | 51.7 | 50.5 | 47.1 | 44.4 | 41.8 | 41.5 | 41.2 | 46.6 | 0.0 | 46.6 |
| | 17 | 48.3 | 58.0 | 43.1 | 57.3 | 56.3 | 53.5 | 51.4 | 47.8 | 46.1 | 44.1 | 43.7 | 43.3 | 48.3 | 0.0 | 48.3 |
| | 18 | 48.9 | 63.3 | 42.8 | 62.5 | 61.5 | 59.0 | 56.3 | 48.4 | 46.3 | 43.9 | 43.5 | 43.0 | 48.9 | 0.0 | 48.9 |
| | 19 | 43.8 | 64.5 | 39.6 | 64.2 | 63.9 | 63.0 | 62.2 | 53.5 | 43.4 | 40.4 | 40.0 | 39.7 | 43.8 | 5.0 | 48.8 |
| | 20 | 43.1 | 50.3 | 40.2 | 49.9 | 49.4 | 47.9 | 46.4 | 42.7 | 41.6 | 40.7 | 40.5 | 40.3 | 43.1 | 5.0 | 48.1 |
| | 21 | 45.3 | 63.9 | 43.0 | 63.5 | 62.9 | 60.6 | 58.4 | 46.3 | 45.0 | 43.6 | 43.4 | 43.1 | 45.3 | 5.0 | 50.3 |
| Night | 22 | 45.7 | 53.7 | 41.8 | 53.3 | 52.6 | 51.0 | 49.3 | 45.6 | 43.8 | 42.3 | 42.1 | 41.9 | 45.7 | 10.0 | 55.7 |
| | 23 | 40.8 | 46.0 | 38.0 | 45.6 | 45.1 | 44.1 | 43.4 | 41.4 | 39.8 | 38.5 | 38.3 | 38.1 | 40.8 | 10.0 | 50.8 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.9 | 50.3 | 36.4 | 49.9 | 49.4 | 47.9 | 46.4 | 42.2 | 39.9 | 38.4 | 37.9 | 36.8 |
| | Max | 50.6 | 67.4 | 43.1 | 66.2 | 65.5 | 64.2 | 63.4 | 59.1 | 54.8 | 44.1 | 43.7 | 43.3 |
| Energy Average | | 47.2 | Average: | | 58.3 | 57.6 | 55.6 | 53.6 | 47.6 | 44.2 | 40.9 | 40.5 | 40.1 |
| Night | Min | 36.6 | 40.5 | 32.4 | 40.2 | 39.9 | 39.4 | 39.0 | 35.2 | 33.6 | 32.7 | 32.6 | 32.5 |
| | Max | 45.7 | 53.7 | 41.8 | 53.3 | 52.6 | 51.0 | 49.3 | 45.6 | 43.8 | 42.3 | 42.1 | 41.9 |
| Energy Average | | 40.6 | Average: | | 46.0 | 45.5 | 44.1 | 42.8 | 39.2 | 37.7 | 36.4 | 36.2 | 36.0 |

| $L_{eq}$ (dBA) | | |
|---|---|---|
| 24-Hour | Daytime (7am-10pm) | Nighttime (10pm-7am) |
| **45.7** | **47.2** | **40.6** |



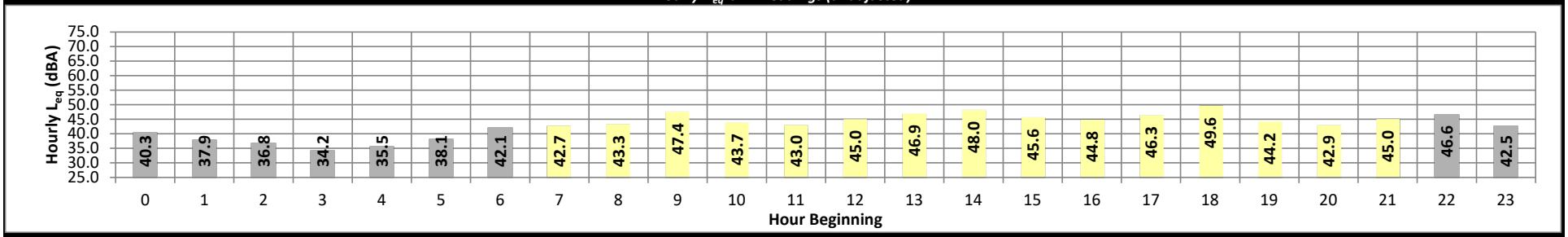
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 *Location:* L4 - Located south of the Project site near single-family *Meter:* Piccolo II *JN:* 14319

*Project:* Colonies Upland *Source:* residence at 1497 Fernando Avenue. *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 40.3 | 74.8 | 37.2 | 74.5 | 74.0 | 71.4 | 66.4 | 58.5 | 45.8 | 38.4 | 37.8 | 37.3 | 40.3 | 10.0 | 50.3 |
| | 1 | 37.9 | 42.3 | 34.3 | 41.9 | 41.5 | 40.9 | 40.4 | 38.9 | 37.5 | 34.8 | 34.6 | 34.4 | 37.9 | 10.0 | 47.9 |
| | 2 | 36.8 | 41.9 | 34.3 | 41.4 | 40.8 | 40.0 | 39.5 | 37.1 | 36.0 | 34.7 | 34.6 | 34.4 | 36.8 | 10.0 | 46.8 |
| | 3 | 34.2 | 57.4 | 32.8 | 56.9 | 56.3 | 54.0 | 49.8 | 37.1 | 33.7 | 33.0 | 32.9 | 32.8 | 34.2 | 10.0 | 44.2 |
| | 4 | 35.5 | 41.4 | 33.0 | 40.9 | 40.6 | 39.0 | 37.8 | 36.0 | 34.4 | 33.3 | 33.2 | 33.0 | 35.5 | 10.0 | 45.5 |
| | 5 | 38.1 | 43.0 | 34.0 | 42.5 | 42.1 | 41.4 | 40.8 | 39.0 | 37.5 | 35.1 | 34.5 | 34.2 | 38.1 | 10.0 | 48.1 |
| | 6 | 42.1 | 51.5 | 35.6 | 51.2 | 50.5 | 48.2 | 46.8 | 41.5 | 38.2 | 36.2 | 36.0 | 35.7 | 42.1 | 10.0 | 52.1 |
| Day | 7 | 42.7 | 51.6 | 35.7 | 50.9 | 50.2 | 47.7 | 46.0 | 43.1 | 40.5 | 37.1 | 36.5 | 35.9 | 42.7 | 0.0 | 42.7 |
| | 8 | 43.3 | 52.3 | 36.8 | 51.8 | 51.2 | 49.6 | 48.0 | 42.8 | 39.9 | 37.7 | 37.3 | 37.0 | 43.3 | 0.0 | 43.3 |
| | 9 | 47.4 | 56.6 | 37.9 | 56.0 | 55.5 | 54.0 | 53.1 | 46.2 | 42.8 | 38.9 | 38.5 | 38.0 | 47.4 | 0.0 | 47.4 |
| | 10 | 43.7 | 53.4 | 38.4 | 53.1 | 52.5 | 49.3 | 46.7 | 43.0 | 41.2 | 39.2 | 38.9 | 38.6 | 43.7 | 0.0 | 43.7 |
| | 11 | 43.0 | 51.3 | 38.5 | 50.7 | 49.9 | 47.7 | 46.6 | 42.8 | 41.1 | 39.1 | 38.9 | 38.7 | 43.0 | 0.0 | 43.0 |
| | 12 | 45.0 | 55.1 | 39.5 | 54.4 | 53.8 | 51.3 | 49.2 | 43.9 | 41.5 | 40.1 | 39.8 | 39.6 | 45.0 | 0.0 | 45.0 |
| | 13 | 46.9 | 58.0 | 39.9 | 57.4 | 56.3 | 53.5 | 51.2 | 45.3 | 41.9 | 40.4 | 40.2 | 40.0 | 46.9 | 0.0 | 46.9 |
| | 14 | 48.0 | 66.1 | 45.5 | 66.0 | 65.7 | 64.3 | 62.8 | 54.9 | 49.9 | 46.4 | 46.1 | 45.7 | 48.0 | 0.0 | 48.0 |
| | 15 | 45.6 | 53.6 | 42.0 | 53.0 | 52.4 | 50.1 | 48.3 | 45.5 | 44.0 | 42.6 | 42.4 | 42.1 | 45.6 | 0.0 | 45.6 |
| | 16 | 44.8 | 74.4 | 41.2 | 73.8 | 72.9 | 70.7 | 67.8 | 61.7 | 52.8 | 42.2 | 41.8 | 41.4 | 44.8 | 0.0 | 44.8 |
| | 17 | 46.3 | 61.3 | 41.6 | 61.1 | 60.6 | 58.9 | 57.0 | 47.4 | 44.2 | 42.2 | 41.9 | 41.7 | 46.3 | 0.0 | 46.3 |
| | 18 | 49.6 | 76.6 | 43.0 | 76.4 | 75.7 | 71.0 | 67.8 | 56.0 | 47.1 | 43.9 | 43.6 | 43.2 | 49.6 | 0.0 | 49.6 |
| | 19 | 44.2 | 52.5 | 39.5 | 51.8 | 51.0 | 49.1 | 47.7 | 44.1 | 42.5 | 40.3 | 39.9 | 39.6 | 44.2 | 5.0 | 49.2 |
| | 20 | 42.9 | 49.5 | 39.7 | 49.2 | 48.8 | 47.3 | 45.9 | 42.9 | 41.7 | 40.2 | 40.0 | 39.8 | 42.9 | 5.0 | 47.9 |
| | 21 | 45.0 | 79.2 | 42.8 | 78.8 | 78.3 | 75.2 | 69.7 | 58.7 | 49.9 | 43.6 | 43.3 | 42.9 | 45.0 | 5.0 | 50.0 |
| Night | 22 | 46.6 | 54.0 | 41.7 | 53.6 | 53.1 | 51.7 | 50.7 | 47.0 | 44.6 | 42.3 | 42.1 | 41.9 | 46.6 | 10.0 | 56.6 |
| | 23 | 42.5 | 51.0 | 37.4 | 50.7 | 50.2 | 48.2 | 46.2 | 42.5 | 40.1 | 38.1 | 37.8 | 37.5 | 42.5 | 10.0 | 52.5 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 42.7 | 49.5 | 35.7 | 49.2 | 48.8 | 47.3 | 45.9 | 42.8 | 39.9 | 37.1 | 36.5 | 35.9 |
| | Max | 49.6 | 79.2 | 45.5 | 78.8 | 78.3 | 75.2 | 69.7 | 61.7 | 52.8 | 46.4 | 46.1 | 45.7 |
| Energy Average | | 45.7 | Average: | | 59.0 | 58.3 | 56.0 | 53.9 | 47.9 | 44.1 | 40.9 | 40.6 | 40.3 |
| Night | Min | 34.2 | 41.4 | 32.8 | 40.9 | 40.6 | 39.0 | 37.8 | 36.0 | 33.7 | 33.0 | 32.9 | 32.8 |
| | Max | 46.6 | 74.8 | 41.7 | 74.5 | 74.0 | 71.4 | 66.4 | 58.5 | 45.8 | 42.3 | 42.1 | 41.9 |
| Energy Average | | 41.0 | Average: | | 50.4 | 49.9 | 48.3 | 46.5 | 42.0 | 38.7 | 36.2 | 35.9 | 35.7 |

| 24-Hour | $L_{eq}$ (dBA) Daytime (7am-10pm) | Nighttime (10pm-7am) |
|---|---|---|
| **44.5** | **45.7** | **41.0** |



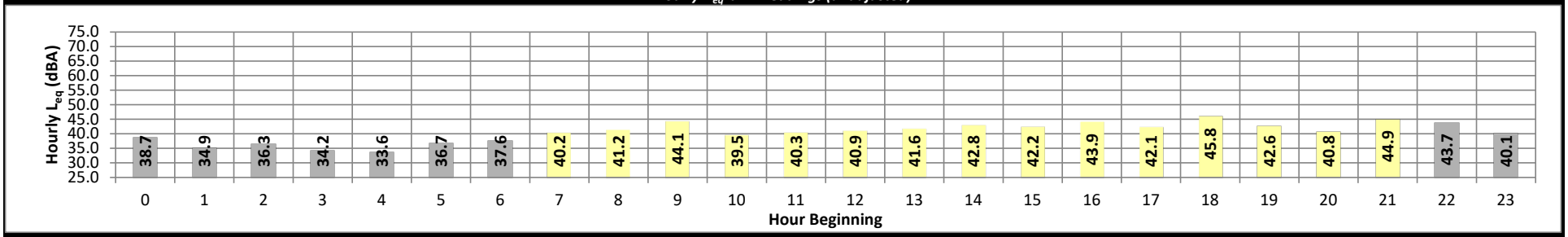
URBAN CROSSROADS

## 24-Hour Noise Level Measurement Summary

*Date:* Tuesday, August 31, 2021 | *Location:* L5 - Located west of the Project site near single-family | *Meter:* Piccolo II | *JN:* 14319

*Project:* Colonies Upland | *Source:* residence at 1520 North Himalayas Circle. | *Analyst:* A. Khan

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 38.7 | 57.9 | 35.9 | 57.4 | 56.9 | 52.7 | 50.1 | 42.7 | 39.0 | 36.8 | 36.5 | 36.1 | 38.7 | 10.0 | 48.7 |
| | 1 | 34.9 | 40.8 | 32.8 | 40.3 | 40.0 | 39.2 | 38.7 | 37.0 | 35.6 | 33.8 | 33.3 | 32.9 | 34.9 | 10.0 | 44.9 |
| | 2 | 36.3 | 42.9 | 32.3 | 42.4 | 41.7 | 40.2 | 39.2 | 37.0 | 35.2 | 32.9 | 32.7 | 32.4 | 36.3 | 10.0 | 46.3 |
| | 3 | 34.2 | 40.5 | 31.5 | 40.2 | 39.9 | 38.7 | 37.7 | 34.2 | 32.9 | 31.9 | 31.7 | 31.6 | 34.2 | 10.0 | 44.2 |
| | 4 | 33.6 | 37.9 | 31.4 | 37.5 | 37.2 | 36.4 | 35.7 | 34.2 | 32.9 | 31.7 | 31.5 | 31.4 | 33.6 | 10.0 | 43.6 |
| | 5 | 36.7 | 41.3 | 33.0 | 40.8 | 40.4 | 39.6 | 39.1 | 37.5 | 36.0 | 34.2 | 33.6 | 33.2 | 36.7 | 10.0 | 46.7 |
| | 6 | 37.6 | 46.1 | 33.8 | 45.0 | 43.9 | 41.4 | 40.3 | 37.7 | 36.1 | 34.4 | 34.2 | 33.9 | 37.6 | 10.0 | 47.6 |
| Day | 7 | 40.2 | 50.0 | 34.6 | 48.5 | 47.2 | 45.0 | 43.7 | 40.3 | 38.3 | 35.7 | 35.2 | 34.7 | 40.2 | 0.0 | 40.2 |
| | 8 | 41.2 | 51.0 | 35.7 | 49.5 | 48.8 | 47.3 | 46.1 | 40.1 | 38.2 | 36.4 | 36.1 | 35.8 | 41.2 | 0.0 | 41.2 |
| | 9 | 44.1 | 54.0 | 36.6 | 52.7 | 51.5 | 49.7 | 48.3 | 44.4 | 41.2 | 37.7 | 37.3 | 36.8 | 44.1 | 0.0 | 44.1 |
| | 10 | 39.5 | 46.0 | 36.6 | 45.0 | 44.1 | 42.5 | 41.6 | 39.9 | 38.7 | 37.3 | 37.0 | 36.7 | 39.5 | 0.0 | 39.5 |
| | 11 | 40.3 | 46.9 | 36.9 | 45.9 | 45.2 | 43.9 | 43.1 | 40.7 | 39.3 | 37.7 | 37.4 | 37.0 | 40.3 | 0.0 | 40.3 |
| | 12 | 40.9 | 50.9 | 37.0 | 49.5 | 48.2 | 45.4 | 43.7 | 40.6 | 39.0 | 37.6 | 37.4 | 37.1 | 40.9 | 0.0 | 40.9 |
| | 13 | 41.6 | 50.9 | 36.8 | 49.6 | 48.4 | 46.4 | 45.5 | 41.6 | 39.4 | 37.5 | 37.2 | 36.9 | 41.6 | 0.0 | 41.6 |
| | 14 | 42.8 | 49.6 | 39.3 | 49.2 | 48.7 | 47.7 | 46.8 | 43.0 | 41.0 | 39.8 | 39.7 | 39.4 | 42.8 | 0.0 | 42.8 |
| | 15 | 42.2 | 47.0 | 39.6 | 46.4 | 45.8 | 44.8 | 44.3 | 43.0 | 41.6 | 40.3 | 40.1 | 39.8 | 42.2 | 0.0 | 42.2 |
| | 16 | 43.9 | 50.7 | 39.0 | 50.3 | 49.8 | 48.9 | 48.2 | 44.7 | 41.7 | 39.6 | 39.3 | 39.1 | 43.9 | 0.0 | 43.9 |
| | 17 | 42.1 | 48.1 | 39.9 | 47.0 | 46.3 | 44.8 | 44.0 | 42.5 | 41.5 | 40.4 | 40.2 | 40.0 | 42.1 | 0.0 | 42.1 |
| | 18 | 45.8 | 51.5 | 41.4 | 51.0 | 50.6 | 49.9 | 49.2 | 46.7 | 44.6 | 42.3 | 41.9 | 41.5 | 45.8 | 0.0 | 45.8 |
| | 19 | 42.6 | 49.1 | 38.4 | 48.5 | 48.0 | 46.7 | 45.7 | 43.3 | 41.2 | 39.1 | 38.8 | 38.5 | 42.6 | 5.0 | 47.6 |
| | 20 | 40.8 | 45.3 | 38.6 | 44.8 | 44.3 | 43.2 | 42.5 | 41.2 | 40.2 | 39.1 | 38.9 | 38.7 | 40.8 | 5.0 | 45.8 |
| | 21 | 44.9 | 53.0 | 41.2 | 52.5 | 51.8 | 50.3 | 48.2 | 44.8 | 43.3 | 41.8 | 41.6 | 41.4 | 44.9 | 5.0 | 49.9 |
| Night | 22 | 43.7 | 51.1 | 40.2 | 50.0 | 49.0 | 47.4 | 46.6 | 44.3 | 42.4 | 40.9 | 40.6 | 40.3 | 43.7 | 10.0 | 53.7 |
| | 23 | 40.1 | 47.7 | 36.2 | 46.8 | 45.8 | 44.2 | 43.2 | 40.7 | 38.7 | 36.9 | 36.7 | 36.3 | 40.1 | 10.0 | 50.1 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 39.5 | 45.3 | 34.6 | 44.8 | 44.1 | 42.5 | 41.6 | 39.9 | 38.2 | 35.7 | 35.2 | 34.7 |
| | Max | 45.8 | 54.0 | 41.4 | 52.7 | 51.8 | 50.3 | 49.2 | 46.7 | 44.6 | 42.3 | 41.9 | 41.5 |
| Energy Average | | 42.6 | Average: | | 48.7 | 47.9 | 46.4 | 45.4 | 42.4 | 40.6 | 38.8 | 38.5 | 38.2 |
| Night | Min | 33.6 | 37.9 | 31.4 | 37.5 | 37.2 | 36.4 | 35.7 | 34.2 | 32.9 | 31.7 | 31.5 | 31.4 |
| | Max | 43.7 | 57.9 | 40.2 | 57.4 | 56.9 | 52.7 | 50.1 | 44.3 | 42.4 | 40.9 | 40.6 | 40.3 |
| Energy Average | | 38.5 | Average: | | 44.5 | 43.9 | 42.2 | 41.2 | 38.4 | 36.5 | 34.8 | 34.5 | 34.2 |

| 24-Hour | $L_{eq}$ (dBA) Daytime (7am-10pm) | Nighttime (10pm-7am) |
|---|---|---|
| **41.5** | **42.6** | **38.5** |



URBAN CROSSROADS

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# APPENDIX E

# CITY OF UPLAND MUNICIPAL CODE NOISE STANDARDS

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# Chapter 9.40 UNNECESSARY NOISE

## Note

* Prior ordinance history: Ord. 947.

## 9.40.010 Purpose.

The purpose of this chapter is to establish criteria and standards for the regulation of noise levels within the city. (Prior code § 5400.100)

## 9.40.020 Definitions.

As used in this chapter, specific words and phrases are defined as follows:

"Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise.

"Average noise level" means the logarithmic average of noise samples taken over a specified length of time.

"Commercial purpose" means the use, operation or maintenance of any sound-amplifying equipment for the purpose of advertising any business, goods, or services and/or for the purpose of advertising or attracting the attention of the public to or soliciting patronage from any performance, entertainment, exhibition or event, or for the purpose of demonstrating any such sound equipment.

"Construction material manufacturer" means any use located on the same property as the mining industry, manufacturing products including concrete, asphalt, concrete blocks, concrete pipe, roofing tile or other similar materials.

"Cumulative time period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

"Decibel (dB)" means a measurement unit of sound pressure level which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio.

"Impact noise" means the sound produced by the impact or collision of one moving object or mass with a second object or mass that is stationary or moving.

"Intrusive noise" means a sound which intrudes over and above the existing ambient noise level at a given location.

"Mining industry" means any industry which extracts sand and gravel resources from the ground.

"Motor driven vehicle" means and includes, but is not limited to, any automobile, truck, van, bus, motorcycle, minibike, go-cart or other self-propelled vehicle, on or off road.

"Noise" means any sound that is loud or disturbing or that interferes with one's ability to hear some other sound.

"Noise level" means the "A" weighted sound pressure level in decibels audible to humans obtained by using a sound level meter. The unit of noise level measurement shall be designated as dB(A).

"Person" means a person, firm, association, co-partnership, joint venture, corporation, or any entity, public or private in nature.

"Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

"Sound pressure level of a sound," in decibels, means 20 times the logarithm to the base 10 of the ratio of the pressure of this sound to the reference pressure, which reference pressure shall be explicitly stated. (Prior code § 5400.300)

## 9.40.030 Noise level measurement criteria.

A. Any noise level measurement, made pursuant to the provisions of this chapter, shall be determined by using a sound level meter that meets the minimum requirements of the American National Standard Institute for sound level meters, or by using an instrument with associated recording and analyzing equipment that will provide equivalent data.

B. The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The sound level of the objectionable noise;
2. The sound level of the ambient noise;
3. The proximity of the noise to residential sleeping facilities;
4. The nature and zoning of the area within which the noise emanates;
5. The number of persons affected by the noise source;
6. The time of day or night the noise occurs;
7. The duration of the noise and its tonal, informational, or musical content;
8. Whether the noise is continuous, recurrent, or intermittent;
9. Whether the noise is produced by a commercial or noncommercial activity.

C. The above considerations shall be considered in addition to the noise levels set forth in this section in determining a violation. However, noises do not necessarily need to exceed those noise level limits to be considered unnecessary or unusual so as to cause discomfort or annoyance to persons in the area. (Prior code § 5400.400)

## 9.40.040 Base ambient noise level.

All ambient noise measurements shall commence at the base ambient noise levels in decibels within the respective times and zones as follows:

| Decibels | Time | Zone Use |
|---|---|---|
| 45 dB(A) | 10:00 p.m.—7:00 a.m. | Residential |
| 55 dB(A) | 7:00 a.m.—10:00 p.m. | Residential |
| 65 dB(A) | Anytime | Uses not specified |
| 75 dB(A) | Anytime | Industrial and commercial |

Actual decibel measurements exceeding the above levels at the times and within the zones corresponding thereto shall be employed as the base ambient noise level referred to in this chapter. Otherwise, no ambient noise shall be deemed to be less than the above specified levels. (Prior code § 5400.500)

## 9.40.050 Exterior noise level measurement.

Exterior noise levels shall be measured at any point relative to the closest point of the source of the noise at the property line on the affected property. Measurements will not be made during extraordinary times, such as during the movement of a nearby train or airplane. (Prior code § 5400.600)

## 9.40.060 Excessive noise unlawful.

A. It is unlawful for any person at any location to create any noise, or to allow the creation of any noise, when such noise causes the noise level to exceed any noise level for the cumulative time periods specified below in Section 9.40.070 and Section 9.40.080.

B. Furthermore, notwithstanding any specified noise level, it is also unlawful for any person to wilfully make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person residing in the area, and it is unlawful for any person in ownership or control of any premises to knowingly permit a violation of this section upon the premises. (Prior code § 5400.700)

## 9.40.070 Maximum residential noise levels.

Exterior noise shall be measured on the exterior of any residential property, and no noise level shall exceed the following for the duration periods specified:

| Noise Level Exceeded | Maximum Duration Period |
|---|---|
| Base ambient noise level (BANL) | 30 minutes in any hour |
| 5 dB(A) above BANL | 15 minutes in any hour |
| 10 dB(A) above BANL | 5 minutes in any hour |
| 15 dB(A) above BANL | 1 minute in any hour |
| 20 d(B)(A) above BANL | Not permitted |

(Prior code § 5400.800)

## 9.40.080 Maximum nonresidential noise levels.

Measured on the exterior of nonresidential properties, no noise level shall exceed the respective base ambient noise levels for nonresidential land uses as determined by development standards established by the regulating agency. (Prior code § 5400.900)

## 9.40.090 Mining industry allowed noise levels for residential property.

A. Exemptions. This section shall supersede all the provisions of Sections 9.40.040 and 9.46.070 relative to allowed noise for mining industry.

B. Allowed Levels. The allowed maximum exterior average sound level in any hour at any property zoned for residential use shall be as follows:

| Mining Industry Use and Days Allowed | Times | Allowed Levels |
|---|---|---|
| **Monday—Friday:** | | |
| Quarry/plant | 6 a.m.—6 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—6 p.m. | 55 dB(A) |
| **Saturday:** | | |
| Quarry/plant | 7 a.m.—3 p.m. | 55 dB(A) |
| Construction material manufacturer | 5 a.m.—3 p.m. | 55 dB(A) |
| **All Times:** | | |
| Quarry/plant | | 45 dB(A) |
| Construction material manufacturer | | 45 dB(A) |

C. Exceptions. Exceptions may be granted in the event of a proven emergency situation or required by a public agency and written authorization is obtained from the city manager or designee prior to quarry, plant or construction

material manufacturer operations being conducted. The maximum exterior sound level at any property zoned for residential use shall not exceed 55 dB(A) during such exception.

D. Measurement Parameters.

1. Measurements shall be made to the one-tenth decibel, but shall be reported to the integer value. Values of 0.1 to 0.4 shall be rounded down to the lower integer. Values of 0.5 to 0.9 shall be rounded up to the higher integer.

2. If measurements are made for more than one hour, the subsequent measurements shall be made on one hour increments. For a series of one hour measurements, compliance shall be determined by the highest average hourly reading. Measurements shall be started on the hour and ended on the hour.

3. Measurements of less than one hour, extrapolated to one hour shall not be used to determine compliance or violation.

4. Measurements will be made on the "A" weighted scale and a slow response.

E. Measurement Location. Exterior measurements shall be at locations on residential property that are considered accessible for normal and usual outdoor human activity and which are intended and used for such purposes. The receptor shall be placed at five feet above the ground surface and 10 feet from any reflecting surface. When these conditions cannot be met, the actual location utilized shall be noted in writing.

F. Calibration. Prior to, and after each measurement period, the sound level meter shall be calibrated using an acoustic calibrator of the coupler type.

Each year, the sound level meter and acoustic calibrator shall be calibrated to manufacturers' specifications by a laboratory subject to the National Bureau of Standards.

G. Ambient Noise.

1. Compliance applies only to the alleged offending source. Preferably, an ambient measurement will be measured at the affected property while the source is nonoperational and immediately prior to or immediately after the measurement period while the source is operating. If this procedure is not feasible and the source operation cannot be controlled, then an ambient measurement will be made at some other location in the vicinity that in the judgment of the measurement technician is representative of the situation at the affected property.

2. If the ambient level is below the source level by 10 dB(A) or more, then the measurement with the source in operation will be equivalent to the source alone within the prescribed resolution. If the ambient level is less than 10 dB(A) lower than the source, then the ambient level will be subtracted logarithmically from the combined measurement to determine the actual source level. If the ambient level is higher than the source level, the source will be considered to comply regardless of its level.

H. Record Keeping. When applying this section for an enforcement action, the following information, as a minimum, shall be recorded and maintained:

1. The date, start time, stop time, average "A" weighted sound level, meter scale when appropriate, slow or fast response, equipment manufacturer, model number and serial number, and the ambient sound level shall be documented.

2. The location of the source, the property measurement point, and the ambient measurement point shall be documented and scaled dimensionally. Photos are not necessary but encouraged. The data sheets shall be signed and dated by the measurement technician.

3. In the event auxiliary recording devices are used for data storage, then settings shall be listed, and equipment type, manufacturer, model and serial number listed.

I. Verification. If data is to be used for enforcement purposes, the technician will certify in writing that the data recorded was from the source and that all procedures have been complied with in the measurement and reporting. (Prior code § 5400.950)

## 9.40.100 Noises prohibited—Unnecessary noise standard.

The following acts are declared to be loud, disturbing and unnecessary noises in violation of this chapter, but such enumeration shall not be deemed to be exclusive, namely:

A. Impact, Repetitive and Tone Noise Levels. In the event any offending noise consists primarily of impact noise, repetitive noise, or simple tone noise, each of the maximum permitted noise levels specified in Section 9.40.070 of this chapter shall be reduced by five dB(A).

B. Radios, Televisions and Stereos. It is unlawful for any person to play, use, operate, or permit to be played, used or operated any radio, television set, musical instrument, phonograph, stereophonic equipment, jukebox or other machine or device for producing, reproducing or amplifying sound when audible at a distance of 50 feet or more from the source of the sound and/ or when audible within any other residence or establishment.

C. Hawkers and Peddlers. It is unlawful for any person to sell anything by public outcry within any area of the city. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, and other similar licensed public entertainment events.

D. Drums and Musical Instruments. It is unlawful for any person to use any drum or other percussion or musical instrument or device of any kind for the purpose of attracting attention by the creation of noise within the city.

E. Machinery, Equipment, Fans and Air Conditioning. It is unlawful for any person to operate, cause to operate or permit the operation of any machinery, equipment, device, pump, fan, compressor, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient noise base level by five dB(A).

F. Motor Driven Vehicles. It is unlawful for any person to operate any motor driven vehicle within the city that, due to the nature of the operation of the vehicle, or due to the operating condition of the vehicle, or due to any modification made to the vehicle, generates noise so that a reasonable person is caused discomfort or annoyance.

G. Horns, Signaling Devices. It is unlawful for any person to cause the sounding of any horn or signaling device on any automobile, motorcycle, street car or other motor driven vehicle on any street or public place of the city, except as a danger warning; to create by means of any such signaling device any unreasonably loud or harsh sound; and to create the sounding of any such device for an unnecessary and unreasonable period of time. It is unlawful for any person to use any signaling device except one operated by hand or electricity; to use any horn, whistle or other device operated by engine exhaust; or to use any such signaling device when traffic is for any reason held up.

H. Loudspeakers, Amplifiers for Advertising. It is unlawful for any person to use, operate or permit to be played, used, or operated any radio receiving set, musical instrument, phonograph, loudspeaker, sound amplifier, or other machine or device for the producing or reproducing of sound which is cast upon the public streets for the purpose of commercial advertising or attracting the attention of the public to any building or structure.

I. Yelling, Shouting. It is unlawful for any person to yell, shout, hoot, whistle, or sing on the public streets, particularly between the hours of 11:00 p.m. and 7:00 a.m., or at any time or place so as to annoy or disturb the quiet, comfort, or repose of any persons in the vicinity.

J. Animals and Fowl. It is unlawful for any person to keep or maintain, or to permit such activity, upon any premises owned, or occupied, or controlled by such person any animal or fowl otherwise permitted to be kept which, by any sound, cry, or behavioral noise, causes annoyance or discomfort to a reasonable person in any residential neighborhood.

K. Exhaust. It is unlawful for any person to discharge into the open air the exhaust of any steam engine, stationary internal combustion engine, motorboat, or motor driven vehicle except through a muffler or other device which will effectively prevent loud or explosive noises therefrom.

L. Loading, Unloading, Opening Boxes. It is unlawful for any person to create any loud and excessive noise in connection with loading or unloading any vehicle or the opening and destruction of bales, boxes, crates, and containers.

M. Construction or Repairing of Buildings. It is unlawful for any person to engage in or permit the erection (including excavation), demolition, alteration or repair of any building other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days or less while the emergency continues, and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be

impaired by the erection, demolition, alteration or repair of any building or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he or she shall further determine that loss or inconvenience would result to any party in interest, he or she may grant permission for such work to be done within the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work.

N. Metal Rails, Pillars and Columns—Transportation Thereof. It is unlawful for any person to transport rails, pillars or columns of iron, steel or other material over and along streets and other public places upon carts, trays, cars, trucks, or in any other manner so loaded as to cause loud noises or as to disturb the peace and quiet of such streets or other public places.

O. Hammers, Etc. It is unlawful for any person to operate between the hours of 10:00 p.m. and 7:00 a.m. any steam shovel, pneumatic hammer, derrick, steam or electric hoist or other appliance, the use of which is attended by loud or unusual noise.

P. Blowers. It is unlawful for any person to operate any noise-creating blower or power fan or any internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device sufficient to deaden such noise.

Q. Exceptions. This section shall not apply to persons who are participants in events for which they have obtained a valid permit from the city and have been authorized to engage in such conduct. (Prior code § 5400.1000)

## 9.40.110 Violation a misdemeanor.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined an amount not exceeding $1,000.00, or be imprisoned in the city or county jail for a period not exceeding six months, or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder. (Prior code § 5400.1100)

## 9.40.120 Manner of enforcement.

Violations of this chapter shall be prosecuted in the same manner as other misdemeanor violations of the city's code. (Prior code § 5400.1200)

## 9.40.130 Additional remedy—Injunction.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provision hereof and which causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health or peace of residents in the area shall be deemed, and is declared to be, a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction. (Prior code § 5400.1300)

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View the mobile version.

# APPENDIX F

# OPERATIONAL NOISE LEVEL CALCULATIONS

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# 14896 - Upland Colonies

**CadnaA Noise Prediction Model:** 14896-03.cna
**Date:** 19.06.23
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.01 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 999.99 |
| Min. Length of Section (#(Unit,LEN)) | 1.01 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 5.00 |
| Night-time Penalty (dB) | 10.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Incl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.50 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (FTA/FRA) | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Night | CNEL | Day | Night | CNEL | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| RECEIVERS | | R01 | 43.8 | 34.1 | 43.5 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142210.48 | 2353699.29 | 5.00 |
| RECEIVERS | | R02 | 50.0 | 35.3 | 48.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142953.70 | 2353783.32 | 5.00 |
| RECEIVERS | | R03 | 30.9 | 19.6 | 30.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6144631.55 | 2353746.43 | 5.00 |
| RECEIVERS | | R04 | 35.9 | 20.6 | 33.8 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6144399.08 | 2353347.84 | 5.00 |
| RECEIVERS | | R05 | 44.6 | 33.6 | 43.7 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6143420.50 | 2353349.82 | 5.00 |
| RECEIVERS | | R06 | 51.3 | 36.2 | 49.3 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6143159.29 | 2353363.44 | 5.00 |
| RECEIVERS | | R07 | 46.7 | 33.6 | 45.2 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6142773.82 | 2353163.07 | 5.00 |
| RECEIVERS | | R08 | 43.3 | 30.0 | 41.7 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141897.50 | 2353158.34 | 5.00 |
| RECEIVERS | | R09 | 32.9 | 21.6 | 32.0 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141338.47 | 2353287.11 | 5.00 |
| RECEIVERS | | R10 | 45.2 | 31.4 | 43.5 | 55.0 | 45.0 | 0.0 | | | | 5.00 | a | 6141867.68 | 2353376.72 | 5.00 |

## Point Source(s)

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | POOL07 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142981.07 | 2353406.90 | 5.00 |
| POINTSOURCE | | POOL06 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142990.57 | 2353419.42 | 5.00 |
| POINTSOURCE | | POOL05 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142966.23 | 2353453.82 | 5.00 |
| POINTSOURCE | | POOL04 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142906.57 | 2353409.51 | 5.00 |
| POINTSOURCE | | POOL03 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142924.17 | 2353431.87 | 5.00 |
| POINTSOURCE | | POOL02 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142934.47 | 2353397.94 | 5.00 |
| POINTSOURCE | | POOL01 | 95.0 | 95.0 | 95.0 | Lw | 95 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142953.03 | 2353423.68 | 5.00 |
| POINTSOURCE | | AC01 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143051.36 | 2353436.75 | 5.00 |
| POINTSOURCE | | AC02 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143063.97 | 2353445.60 | 5.00 |

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | AC03 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143143.50 | 2353446.06 | 5.00 |
| POINTSOURCE | | AC04 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143157.96 | 2353443.55 | 5.00 |
| POINTSOURCE | | AC05 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143239.53 | 2353444.21 | 5.00 |
| POINTSOURCE | | AC06 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143251.97 | 2353442.64 | 5.00 |
| POINTSOURCE | | AC07 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143332.37 | 2353440.83 | 5.00 |
| POINTSOURCE | | AC08 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143346.20 | 2353441.27 | 5.00 |
| POINTSOURCE | | AC09 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143483.27 | 2353454.36 | 5.00 |
| POINTSOURCE | | AC10 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143482.58 | 2353467.51 | 5.00 |
| POINTSOURCE | | AC11 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143457.68 | 2353602.74 | 5.00 |
| POINTSOURCE | | AC12 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143389.06 | 2353604.58 | 5.00 |
| POINTSOURCE | | AC13 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143374.10 | 2353604.16 | 5.00 |
| POINTSOURCE | | AC14 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143293.21 | 2353603.94 | 5.00 |
| POINTSOURCE | | AC15 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143280.33 | 2353605.74 | 5.00 |
| POINTSOURCE | | AC16 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143201.28 | 2353607.31 | 5.00 |
| POINTSOURCE | | AC17 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143186.30 | 2353605.52 | 5.00 |
| POINTSOURCE | | AC18 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143105.70 | 2353608.93 | 5.00 |
| POINTSOURCE | | AC19 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143091.89 | 2353609.39 | 5.00 |
| POINTSOURCE | | AC20 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6143011.44 | 2353608.48 | 5.00 |
| POINTSOURCE | | AC21 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142978.68 | 2353600.65 | 5.00 |
| POINTSOURCE | | AC22 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142903.59 | 2353555.02 | 5.00 |
| POINTSOURCE | | AC23 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142892.10 | 2353545.25 | 5.00 |
| POINTSOURCE | | AC24 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142828.78 | 2353498.74 | 5.00 |
| POINTSOURCE | | AC25 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142818.45 | 2353490.53 | 5.00 |
| POINTSOURCE | | AC26 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142750.74 | 2353452.48 | 5.00 |
| POINTSOURCE | | AC27 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142737.80 | 2353450.89 | 5.00 |
| POINTSOURCE | | AC28 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142952.17 | 2353279.15 | 5.00 |
| POINTSOURCE | | AC29 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142939.22 | 2353276.87 | 5.00 |
| POINTSOURCE | | AC30 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142858.83 | 2353279.37 | 5.00 |
| POINTSOURCE | | AC31 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142845.20 | 2353277.56 | 5.00 |
| POINTSOURCE | | AC32 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142764.60 | 2353280.96 | 5.00 |
| POINTSOURCE | | AC33 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142751.50 | 2353283.45 | 5.00 |
| POINTSOURCE | | AC34 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142657.09 | 2353448.17 | 5.00 |
| POINTSOURCE | | AC35 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142643.55 | 2353451.12 | 5.00 |
| POINTSOURCE | | AC36 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142670.80 | 2353280.96 | 5.00 |
| POINTSOURCE | | AC37 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142656.98 | 2353280.74 | 5.00 |
| POINTSOURCE | | AC38 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142576.62 | 2353285.27 | 5.00 |
| POINTSOURCE | | AC39 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142563.89 | 2353282.77 | 5.00 |
| POINTSOURCE | | AC40 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142563.12 | 2353451.58 | 5.00 |
| POINTSOURCE | | AC41 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142549.71 | 2353449.08 | 5.00 |
| POINTSOURCE | | AC42 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142482.72 | 2353279.16 | 5.00 |
| POINTSOURCE | | AC43 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142469.92 | 2353285.72 | 5.00 |
| POINTSOURCE | | AC44 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142469.36 | 2353453.62 | 5.00 |
| POINTSOURCE | | AC45 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142455.93 | 2353449.99 | 5.00 |
| POINTSOURCE | | AC46 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142389.05 | 2353287.09 | 5.00 |
| POINTSOURCE | | AC47 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142375.62 | 2353283.23 | 5.00 |
| POINTSOURCE | | AC48 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142376.01 | 2353453.38 | 5.00 |
| POINTSOURCE | | AC49 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142361.70 | 2353451.13 | 5.00 |
| POINTSOURCE | | AC50 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142297.24 | 2353283.88 | 5.00 |
| POINTSOURCE | | AC51 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142281.90 | 2353287.77 | 5.00 |
| POINTSOURCE | | AC52 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142200.99 | 2353286.19 | 5.00 |
| POINTSOURCE | | AC53 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142188.21 | 2353281.19 | 5.00 |
| POINTSOURCE | | AC54 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142082.10 | 2353289.79 | 5.00 |
| POINTSOURCE | | AC55 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142069.38 | 2353287.74 | 5.00 |
| POINTSOURCE | | AC56 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141988.30 | 2353289.56 | 5.00 |
| POINTSOURCE | | AC57 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141975.80 | 2353287.28 | 5.00 |
| POINTSOURCE | | AC58 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142281.09 | 2353454.31 | 5.00 |
| POINTSOURCE | | AC59 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142268.59 | 2353452.25 | 5.00 |
| POINTSOURCE | | AC60 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142187.78 | 2353456.57 | 5.00 |
| POINTSOURCE | | AC61 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142144.52 | 2353457.30 | 5.00 |
| POINTSOURCE | | AC62 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142063.87 | 2353457.53 | 5.00 |
| POINTSOURCE | | AC63 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6142018.57 | 2353458.52 | 5.00 |
| POINTSOURCE | | AC64 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141971.86 | 2353456.59 | 5.00 |
| POINTSOURCE | | AC65 | 73.0 | 73.0 | 73.0 | Lw | 73 | | | | | 0.0 | 5.00 | a | 6141956.64 | 2353454.13 | 5.00 |
| POINTSOURCE | | PARK01 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142008.82 | 2353257.27 | 5.00 |
| POINTSOURCE | | PARK02 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142139.83 | 2353287.22 | 5.00 |
| POINTSOURCE | | PARK03 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142130.95 | 2353338.35 | 5.00 |
| POINTSOURCE | | PARK04 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141890.71 | 2353387.50 | 5.00 |
| POINTSOURCE | | PARK05 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141890.18 | 2353422.63 | 5.00 |
| POINTSOURCE | | PARK06 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142158.94 | 2353412.19 | 5.00 |
| POINTSOURCE | | PARK07 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142170.46 | 2353437.15 | 5.00 |
| POINTSOURCE | | PARK08 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142165.57 | 2353455.81 | 5.00 |
| POINTSOURCE | | PARK09 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141904.99 | 2353441.18 | 5.00 |
| POINTSOURCE | | PARK10 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141904.68 | 2353409.24 | 5.00 |
| POINTSOURCE | | PARK11 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143110.54 | 2353412.63 | 5.00 |
| POINTSOURCE | | PARK12 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143216.84 | 2353415.14 | 5.00 |
| POINTSOURCE | | PARK13 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143314.39 | 2353409.41 | 5.00 |
| POINTSOURCE | | PARK14 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143441.16 | 2353554.69 | 5.00 |

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | K0 | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (dB) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | PARK15 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143438.04 | 2353569.11 | 5.00 |
| POINTSOURCE | | PARK16 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143436.36 | 2353589.11 | 5.00 |
| POINTSOURCE | | PARK17 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6143441.72 | 2353600.92 | 5.00 |
| POINTSOURCE | | PARK18 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6142136.44 | 2353310.98 | 5.00 |
| POINTSOURCE | | PARK19 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141952.24 | 2353236.43 | 5.00 |
| POINTSOURCE | | PARK20 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141990.78 | 2353232.41 | 5.00 |
| POINTSOURCE | | PARK21 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141986.74 | 2353205.99 | 5.00 |
| POINTSOURCE | | PARK22 | 75.0 | 75.0 | 75.0 | Lw | 75 | | 900.00 | 0.00 | 0.00 | 0.0 | 5.00 | a | 6141947.26 | 2353207.56 | 5.00 |

## Barrier(s)

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | | End | | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141940.55 | 2353333.42 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141934.89 | 2353333.51 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141933.87 | 2353273.26 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142122.57 | 2353271.43 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142123.10 | 2353329.65 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142117.89 | 2353329.74 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142153.33 | 2353327.31 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142147.72 | 2353327.18 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142147.12 | 2353265.68 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142522.84 | 2353262.47 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142945.23 | 2353258.69 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142992.36 | 2353257.90 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142993.26 | 2353324.32 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142987.65 | 2353324.42 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143016.37 | 2353482.86 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143011.20 | 2353482.95 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143010.04 | 2353427.30 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143057.60 | 2353426.04 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143057.49 | 2353432.56 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143385.81 | 2353427.68 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143386.92 | 2353479.96 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143381.76 | 2353480.05 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143443.59 | 2353419.96 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143443.73 | 2353414.80 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143496.47 | 2353414.13 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143497.36 | 2353506.37 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143449.56 | 2353507.18 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143449.91 | 2353501.57 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141920.92 | 2353415.42 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141915.54 | 2353415.73 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141916.28 | 2353472.74 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142151.01 | 2353428.81 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142151.03 | 2353470.11 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6142180.42 | 2353429.21 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6142181.33 | 2353469.83 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143421.15 | 2353565.80 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143426.54 | 2353565.94 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143427.62 | 2353616.87 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143450.95 | 2353576.07 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143451.64 | 2353616.69 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6143492.48 | 2353563.02 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143498.32 | 2353563.15 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6143498.77 | 2353616.12 | 6.00 | 0.00 |
| BARRIEREXISTING | | | 0 | | | | | | 6.00 | a | | | 6141810.74 | 2353254.13 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141878.16 | 2353253.51 | 6.00 | 0.00 |
| | | | | | | | | | | | | | 6141879.89 | 2353453.52 | 6.00 | 0.00 |

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# APPENDIX G

# CONSTRUCTION NOISE LEVEL CALCULATIONS

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# 14896 - Upland Colonies

**CadnaA Noise Prediction Model:** 14896-05_Construction.cna
**Date:** 26.09.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.01 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 999.99 |
| Min. Length of Section (#(Unit,LEN)) | 1.01 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 5.00 |
| Night-time Penalty (dB) | 10.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Incl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.50 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (FTA/FRA) | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Night | CNEL | Day | Night | CNEL | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| RECEIVERS_PROJECT | | R01 | 55.0 | 55.0 | 61.7 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671896.97 | 1865987.11 | 1450.48 |
| RECEIVERS_PROJECT | | R02 | 56.6 | 56.6 | 63.2 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672638.61 | 1866083.69 | 1456.10 |
| RECEIVERS_PROJECT | | R03 | 50.7 | 50.7 | 57.4 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6674316.74 | 1866075.19 | 1442.47 |
| RECEIVERS_PROJECT | | R04 | 53.6 | 53.6 | 60.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6674091.06 | 1865672.75 | 1424.43 |
| RECEIVERS_PROJECT | | R05 | 55.3 | 55.3 | 62.0 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6673112.65 | 1865658.17 | 1430.08 |
| RECEIVERS_PROJECT | | R06 | 58.1 | 58.1 | 64.8 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672851.26 | 1865667.38 | 1433.04 |
| RECEIVERS_PROJECT | | R07 | 56.8 | 56.8 | 63.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672469.26 | 1865460.53 | 1429.93 |
| RECEIVERS_PROJECT | | R08 | 56.6 | 56.6 | 63.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671593.21 | 1865440.98 | 1431.04 |
| RECEIVERS_PROJECT | | R09 | 53.3 | 53.3 | 59.9 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671032.11 | 1865560.27 | 1432.93 |
| RECEIVERS_PROJECT | | R10 | 52.2 | 52.2 | 58.8 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671559.70 | 1865658.81 | 1437.40 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Operating Time | | | Height |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | (ft) |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | |
| SITEBOUNDARY_PROJECT | | CONSTRUCTION | 115.0 | 115.0 | 115.0 | 66.4 | 66.4 | 66.4 | Lw | 115 | | | | | 8 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY_PROJECT | CONSTRUCTION | 8.00 | r | | | 6671573.29 | 1865534.78 | 1437.59 | 1429.59 |
| | | | | | | 6671571.14 | 1865773.41 | 1443.96 | 1435.96 |
| | | | | | | 6671816.13 | 1865773.36 | 1442.13 | 1434.13 |
| | | | | | | 6671816.15 | 1865787.35 | 1443.11 | 1435.11 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6671838.70 | 1865809.35 | 1443.98 | 1435.98 |
| | | | | 6671849.42 | 1865798.07 | 1443.46 | 1435.46 |
| | | | | 6671861.55 | 1865797.31 | 1443.71 | 1435.71 |
| | | | | 6671862.59 | 1865779.23 | 1442.32 | 1434.32 |
| | | | | 6671887.76 | 1865779.46 | 1443.13 | 1435.13 |
| | | | | 6671888.33 | 1865772.13 | 1442.24 | 1434.24 |
| | | | | 6672440.94 | 1865775.51 | 1441.00 | 1433.00 |
| | | | | 6672663.12 | 1865941.30 | 1442.86 | 1434.86 |
| | | | | 6673095.06 | 1865943.55 | 1439.71 | 1431.71 |
| | | | | 6673094.50 | 1865956.52 | 1441.00 | 1433.00 |
| | | | | 6673145.25 | 1865955.40 | 1440.47 | 1432.47 |
| | | | | 6673146.37 | 1865940.17 | 1438.83 | 1430.83 |
| | | | | 6673186.41 | 1865940.17 | 1441.00 | 1433.00 |
| | | | | 6673187.76 | 1865925.00 | 1438.07 | 1430.07 |
| | | | | 6674213.82 | 1865928.33 | 1437.41 | 1429.41 |
| | | | | 6674213.26 | 1865897.88 | 1430.94 | 1422.94 |
| | | | | 6674195.22 | 1865880.96 | 1427.71 | 1419.71 |
| | | | | 6674230.74 | 1865807.65 | 1427.91 | 1419.91 |
| | | | | 6674150.67 | 1865756.90 | 1432.00 | 1424.00 |
| | | | | 6674148.41 | 1865744.50 | 1432.00 | 1424.00 |
| | | | | 6675149.89 | 1865748.45 | 1443.59 | 1435.59 |
| | | | | 6675156.65 | 1865749.11 | 1444.20 | 1436.20 |
| | | | | 6675162.90 | 1865747.80 | 1444.98 | 1436.98 |
| | | | | 6675168.89 | 1865745.46 | 1446.40 | 1438.40 |
| | | | | 6675173.84 | 1865742.34 | 1447.77 | 1439.77 |
| | | | | 6675177.49 | 1865736.61 | 1449.40 | 1441.40 |
| | | | | 6675178.01 | 1865728.01 | 1449.88 | 1441.88 |
| | | | | 6675175.66 | 1865721.24 | 1449.38 | 1441.38 |
| | | | | 6675168.63 | 1865710.83 | 1447.11 | 1439.11 |
| | | | | 6675162.64 | 1865707.44 | 1445.30 | 1437.30 |
| | | | | 6675152.75 | 1865707.96 | 1443.27 | 1435.27 |
| | | | | 6675144.67 | 1865710.04 | 1442.54 | 1434.54 |
| | | | | 6675135.04 | 1865726.19 | 1442.41 | 1434.41 |
| | | | | 6675128.46 | 1865730.97 | 1442.62 | 1434.62 |
| | | | | 6673989.39 | 1865722.51 | 1432.00 | 1424.00 |
| | | | | 6673989.39 | 1865693.75 | 1429.77 | 1421.77 |
| | | | | 6673188.25 | 1865685.03 | 1436.34 | 1428.34 |
| | | | | 6672766.87 | 1865685.54 | 1437.41 | 1429.41 |
| | | | | 6672764.83 | 1865525.71 | 1431.00 | 1423.00 |
| | | | | 6671750.52 | 1865514.47 | 1431.68 | 1423.68 |
| | | | | 6671752.86 | 1865469.68 | 1431.10 | 1423.10 |
| | | | | 6671572.93 | 1865468.63 | 1433.17 | 1425.17 |
| | | | | 6671094.93 | 1865464.81 | 1435.00 | 1427.00 |
| | | | | 6670895.31 | 1865499.77 | 1428.00 | 1420.00 |
| | | | | 6670705.61 | 1865495.26 | 1430.69 | 1422.69 |
| | | | | 6670700.32 | 1865495.13 | 1430.78 | 1422.78 |
| | | | | 6670688.38 | 1865485.46 | 1431.00 | 1423.00 |
| | | | | 6670677.05 | 1865485.91 | 1431.00 | 1423.00 |
| | | | | 6670665.26 | 1865485.61 | 1430.83 | 1422.83 |
| | | | | 6670651.66 | 1865477.75 | 1430.81 | 1422.81 |
| | | | | 6670640.17 | 1865477.29 | 1430.94 | 1422.94 |
| | | | | 6670628.38 | 1865478.65 | 1431.03 | 1423.03 |
| | | | | 6670620.37 | 1865484.40 | 1431.09 | 1423.09 |
| | | | | 6670610.10 | 1865492.41 | 1431.06 | 1423.06 |
| | | | | 6670600.88 | 1865501.63 | 1430.72 | 1422.72 |
| | | | | 6670600.73 | 1865516.44 | 1430.30 | 1422.30 |
| | | | | 6670619.62 | 1865528.07 | 1430.00 | 1422.00 |
| | | | | 6670632.01 | 1865536.84 | 1430.00 | 1422.00 |
| | | | | 6670642.74 | 1865541.68 | 1430.00 | 1422.00 |
| | | | | 6670654.53 | 1865539.56 | 1430.00 | 1422.00 |
| | | | | 6670661.24 | 1865528.15 | 1430.11 | 1422.11 |
| | | | | 6670912.86 | 1865530.12 | 1433.16 | 1425.16 |

## Barrier(s)

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | End | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 r | | 6671504.85 | 1865535.28 | 1437.50 | 1431.50 |
| | | | | | | | | | | | 6671572.26 | 1865535.81 | 1435.97 | 1429.97 |
| | | | | | | | | | | | 6671570.61 | 1865735.80 | 1439.45 | 1433.45 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 r | | 6671435.02 | 1865592.39 | 1436.82 | 1430.82 |
| | | | | | | | | | | | 6671434.23 | 1865537.70 | 1437.13 | 1431.13 |
| | | | | | | | | | | | 6671225.90 | 1865537.18 | 1433.13 | 1427.13 |
| | | | | | | | | | | | 6670910.80 | 1865533.53 | 1431.73 | 1425.73 |
| | | | | | | | | | | | 6670877.72 | 1865548.64 | 1432.17 | 1426.17 |
| | | | | | | | | | | | 6670702.20 | 1865545.51 | 1432.17 | 1426.17 |

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | | End | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | | | | 6670677.72 | 1865570.77 | 1432.46 | 1426.46 |
| | | | | | | | | | | | | 6670677.98 | 1865654.89 | 1433.27 | 1427.27 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671572.96 | 1865279.53 | 291.20 | 285.20 |
| | | | | | | | | | | | | 6671570.82 | 1865467.27 | 1431.27 | 1425.27 |
| | | | | | | | | | | | | 6671641.57 | 1865468.35 | 1430.07 | 1424.07 |
| | | | | | | | | | | | | 6671641.57 | 1865461.19 | 1430.85 | 1424.85 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671798.25 | 1865457.72 | 1431.16 | 1425.16 |
| | | | | | | | | | | | | 6671798.25 | 1865473.34 | 1429.99 | 1423.99 |
| | | | | | | | | | | | | 6672132.02 | 1865474.86 | 1431.00 | 1425.00 |
| | | | | | | | | | | | | 6672420.00 | 1865477.47 | 1430.00 | 1424.00 |
| | | | | | | | | | | | | 6672556.50 | 1865477.47 | 1430.00 | 1424.00 |
| | | | | | | | | | | | | 6672556.50 | 1865462.71 | 1430.00 | 1424.00 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6672700.81 | 1865455.76 | 1429.94 | 1423.94 |
| | | | | | | | | | | | | 6672701.90 | 1865478.55 | 1429.45 | 1423.45 |
| | | | | | | | | | | | | 6672830.80 | 1865479.20 | 1428.00 | 1422.00 |
| | | | | | | | | | | | | 6672830.80 | 1865470.30 | 1427.79 | 1421.79 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6672998.99 | 1865471.17 | 1426.43 | 1420.43 |
| | | | | | | | | | | | | 6672998.77 | 1865482.67 | 1426.40 | 1420.40 |
| | | | | | | | | | | | | 6673061.49 | 1865482.89 | 1425.93 | 1419.93 |
| | | | | | | | | | | | | 6673060.62 | 1865413.45 | 1424.59 | 1418.59 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6674026.75 | 1865690.10 | 1427.05 | 1421.05 |
| | | | | | | | | | | | | 6674226.75 | 1865690.36 | 1427.03 | 1421.03 |
| | | | | | | | | | | | | 6674404.61 | 1865687.75 | 1427.33 | 1421.33 |
| | | | | | | | | | | | | 6674604.61 | 1865689.84 | 1430.82 | 1424.82 |
| | | | | | | | | | | | | 6674927.79 | 1865690.88 | 1431.65 | 1425.65 |
| | | | | | | | | | | | | 6675136.12 | 1865693.74 | 1439.33 | 1433.33 |
| | | | | | | | | | | | | 6675122.58 | 1865646.35 | 1435.17 | 1429.17 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671033.48 | 1865534.95 | 1432.81 | 1426.81 |
| | | | | | | | | | | | | 6671033.22 | 1865602.61 | 1435.12 | 1429.12 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671570.61 | 1865735.58 | 1439.44 | 1433.44 |
| | | | | | | | | | | | | 6671503.79 | 1865735.94 | 1438.42 | 1432.42 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671570.81 | 1865685.95 | 1440.00 | 1434.00 |
| | | | | | | | | | | | | 6671502.06 | 1865685.60 | 1438.30 | 1432.30 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671571.01 | 1865635.77 | 1437.60 | 1431.60 |
| | | | | | | | | | | | | 6671513.34 | 1865635.25 | 1438.00 | 1432.00 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671571.21 | 1865585.95 | 1438.00 | 1432.00 |
| | | | | | | | | | | | | 6671516.29 | 1865585.08 | 1437.91 | 1431.91 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6672769.14 | 1865568.14 | 1433.00 | 1425.00 |
| | | | | | | | | | | | | 6672771.68 | 1865681.93 | 1436.97 | 1428.97 |
| | | | | | | | | | | | | 6673096.16 | 1865683.23 | 1437.94 | 1429.94 |
| | | | | | | | | | | | | 6673355.79 | 1865686.10 | 1436.35 | 1428.35 |
| | | | | | | | | | | | | 6673595.12 | 1865688.44 | 1434.56 | 1426.56 |
| | | | | | | | | | | | | 6673897.72 | 1865690.78 | 1430.70 | 1422.70 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6671433.92 | 1865536.36 | 1439.05 | 1431.05 |
| | | | | | | | | | | | | 6671283.92 | 1865535.84 | 1435.35 | 1427.35 |
| | | | | | | | | | | | | 6671039.39 | 1865533.75 | 1435.01 | 1427.01 |
| | | | | | | | | | | | | 6670909.96 | 1865532.45 | 1433.53 | 1425.53 |
| | | | | | | | | | | | | 6670774.54 | 1865531.15 | 1431.28 | 1423.28 |
| | | | | | | | | | | | | 6670663.35 | 1865530.11 | 1430.20 | 1422.20 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 12.00 | r | | 6671570.61 | 1865735.58 | 1445.44 | 1433.44 |
| | | | | | | | | | | | | 6671571.41 | 1865535.80 | 1442.07 | 1430.07 |
| | | | | | | | | | | | | 6671482.37 | 1865535.10 | 1442.84 | 1430.84 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6671471.07 | 1865467.02 | 1435.00 | 1427.00 |
| | | | | | | | | | | | | 6671572.13 | 1865468.13 | 1433.25 | 1425.25 |
| | | | | | | | | | | | | 6671641.21 | 1865468.35 | 1432.08 | 1424.08 |

## Building(s)

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00002 | x | 0 | | 25.00 | r | 6674267.11 | 1865618.82 | 1443.01 | 1418.01 |
| | | | | | | | | | 6674357.09 | 1865652.60 | 1443.01 | 1419.32 |
| | | | | | | | | | 6674398.74 | 1865571.49 | 1443.01 | 1422.00 |
| | | | | | | | | | 6674286.52 | 1865526.39 | 1443.01 | 1418.45 |
| | | | | | | | | | 6674255.86 | 1865600.51 | 1443.01 | 1418.19 |
| | | | building_00003 | x | 0 | | 25.00 | r | 6674429.92 | 1865642.32 | 1446.75 | 1421.75 |
| | | | | | | | | | 6674432.11 | 1865622.60 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674422.91 | 1865624.35 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674429.56 | 1865552.61 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674551.76 | 1865566.09 | 1446.75 | 1423.94 |
| | | | | | | | | | 6674543.39 | 1865635.35 | 1446.75 | 1423.73 |
| | | | | | | | | | 6674532.77 | 1865634.95 | 1446.75 | 1423.21 |
| | | | | | | | | | 6674530.25 | 1865652.88 | 1446.75 | 1422.76 |
| | | | building_00004 | x | 0 | | 25.00 | r | 6674560.98 | 1865650.88 | 1448.40 | 1423.40 |
| | | | | | | | | | 6674560.96 | 1865565.40 | 1448.40 | 1424.00 |
| | | | | | | | | | 6674680.77 | 1865564.79 | 1448.40 | 1424.63 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6674683.25 | 1865653.45 | 1448.40 | 1425.00 |
| | | | building_00005 | x | 0 | | 25.00 | r | 6674699.14 | 1865654.20 | 1450.00 | 1425.00 |
| | | | | | | | | | 6674699.46 | 1865566.64 | 1450.00 | 1424.78 |
| | | | | | | | | | 6674821.39 | 1865563.56 | 1450.00 | 1426.00 |
| | | | | | | | | | 6674818.24 | 1865654.31 | 1450.00 | 1424.07 |
| | | | building_00006 | x | 0 | | 25.00 | r | 6674832.71 | 1865655.42 | 1449.02 | 1424.02 |
| | | | | | | | | | 6674829.86 | 1865564.65 | 1449.02 | 1425.78 |
| | | | | | | | | | 6674948.98 | 1865560.87 | 1449.02 | 1424.00 |
| | | | | | | | | | 6674950.06 | 1865652.69 | 1449.02 | 1424.00 |
| | | | building_00007 | x | 0 | | 25.00 | r | 6674961.67 | 1865567.61 | 1449.00 | 1424.00 |
| | | | | | | | | | 6674983.22 | 1865478.68 | 1449.00 | 1422.56 |
| | | | | | | | | | 6675070.76 | 1865502.22 | 1449.00 | 1421.67 |
| | | | | | | | | | 6675048.52 | 1865588.68 | 1449.00 | 1423.00 |
| | | | building_00013 | x | 0 | | 25.00 | r | 6672782.25 | 1865641.82 | 1452.00 | 1427.00 |
| | | | | | | | | | 6672813.33 | 1865641.65 | 1452.00 | 1426.82 |
| | | | | | | | | | 6672813.20 | 1865621.70 | 1452.00 | 1426.55 |
| | | | | | | | | | 6672832.99 | 1865621.56 | 1452.00 | 1426.46 |
| | | | | | | | | | 6672832.68 | 1865574.76 | 1452.00 | 1425.86 |
| | | | | | | | | | 6672808.71 | 1865574.92 | 1452.00 | 1425.70 |
| | | | | | | | | | 6672808.82 | 1865592.39 | 1452.00 | 1426.12 |
| | | | | | | | | | 6672802.89 | 1865592.44 | 1452.00 | 1426.07 |
| | | | | | | | | | 6672802.78 | 1865573.96 | 1452.00 | 1425.62 |
| | | | | | | | | | 6672781.83 | 1865574.06 | 1452.00 | 1425.43 |
| | | | building_00014 | x | 0 | | 25.00 | r | 6672850.38 | 1865633.41 | 1451.44 | 1426.44 |
| | | | | | | | | | 6672900.56 | 1865634.00 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672901.00 | 1865596.80 | 1451.44 | 1425.31 |
| | | | | | | | | | 6672874.61 | 1865596.49 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672874.82 | 1865580.73 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672851.00 | 1865580.43 | 1451.44 | 1426.00 |
| | | | building_00015 | x | 0 | | 25.00 | r | 6672913.00 | 1865626.25 | 1450.17 | 1425.17 |
| | | | | | | | | | 6672913.18 | 1865577.78 | 1450.17 | 1425.00 |
| | | | | | | | | | 6672934.52 | 1865577.86 | 1450.17 | 1425.21 |
| | | | | | | | | | 6672934.45 | 1865595.03 | 1450.17 | 1425.40 |
| | | | | | | | | | 6672940.21 | 1865595.06 | 1450.17 | 1425.54 |
| | | | | | | | | | 6672940.27 | 1865577.88 | 1450.17 | 1425.28 |
| | | | | | | | | | 6672965.27 | 1865577.97 | 1450.17 | 1425.52 |
| | | | | | | | | | 6672965.09 | 1865626.44 | 1450.17 | 1426.00 |
| | | | building_00016 | x | 0 | | 25.00 | r | 6672975.52 | 1865629.17 | 1450.91 | 1425.91 |
| | | | | | | | | | 6672976.23 | 1865575.72 | 1450.91 | 1425.21 |
| | | | | | | | | | 6673001.54 | 1865576.03 | 1450.91 | 1425.00 |
| | | | | | | | | | 6673001.32 | 1865593.17 | 1450.91 | 1424.96 |
| | | | | | | | | | 6673027.99 | 1865593.52 | 1450.91 | 1423.72 |
| | | | | | | | | | 6673027.06 | 1865664.92 | 1450.91 | 1427.17 |
| | | | | | | | | | 6673004.18 | 1865664.62 | 1450.91 | 1428.32 |
| | | | | | | | | | 6673004.64 | 1865629.54 | 1450.91 | 1424.19 |
| | | | building_00017 | x | 0 | | 25.00 | r | 6673037.98 | 1865641.89 | 1446.25 | 1421.25 |
| | | | | | | | | | 6673075.51 | 1865642.06 | 1446.25 | 1424.40 |
| | | | | | | | | | 6673075.56 | 1865628.74 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673083.88 | 1865628.77 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673083.99 | 1865607.59 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673081.02 | 1865607.58 | 1446.25 | 1423.97 |
| | | | | | | | | | 6673081.19 | 1865571.30 | 1446.25 | 1423.00 |
| | | | | | | | | | 6673056.49 | 1865571.17 | 1446.25 | 1423.00 |
| | | | | | | | | | 6673056.38 | 1865592.28 | 1446.25 | 1423.10 |
| | | | | | | | | | 6673038.19 | 1865592.21 | 1446.25 | 1423.00 |
| | | | building_00018 | x | 0 | | 25.00 | r | 6673098.20 | 1865628.79 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673098.91 | 1865591.31 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673124.37 | 1865591.80 | 1449.00 | 1423.62 |
| | | | | | | | | | 6673124.70 | 1865575.35 | 1449.00 | 1423.33 |
| | | | | | | | | | 6673149.33 | 1865575.81 | 1449.00 | 1423.10 |
| | | | | | | | | | 6673148.29 | 1865629.73 | 1449.00 | 1423.84 |
| | | | building_00019 | x | 0 | | 25.00 | r | 6673160.17 | 1865625.85 | 1448.73 | 1423.73 |
| | | | | | | | | | 6673211.53 | 1865626.91 | 1448.73 | 1423.71 |
| | | | | | | | | | 6673212.55 | 1865578.62 | 1448.73 | 1423.04 |
| | | | | | | | | | 6673191.12 | 1865578.18 | 1448.73 | 1423.01 |
| | | | | | | | | | 6673190.73 | 1865595.94 | 1448.73 | 1423.26 |
| | | | | | | | | | 6673185.28 | 1865595.81 | 1448.73 | 1423.27 |
| | | | | | | | | | 6673185.68 | 1865578.34 | 1448.73 | 1423.02 |
| | | | | | | | | | 6673161.16 | 1865577.81 | 1448.73 | 1423.04 |
| | | | building_00020 | x | 0 | | 25.00 | r | 6673227.66 | 1865635.56 | 1448.83 | 1423.83 |
| | | | | | | | | | 6673274.75 | 1865635.77 | 1448.83 | 1423.81 |
| | | | | | | | | | 6673274.98 | 1865581.76 | 1448.83 | 1423.00 |
| | | | | | | | | | 6673250.68 | 1865581.67 | 1448.83 | 1423.08 |
| | | | | | | | | | 6673250.60 | 1865604.31 | 1448.83 | 1423.35 |
| | | | | | | | | | 6673247.72 | 1865604.30 | 1448.83 | 1423.36 |
| | | | | | | | | | 6673247.74 | 1865598.47 | 1448.83 | 1423.29 |
| | | | | | | | | | 6673227.83 | 1865598.40 | 1448.83 | 1423.33 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00021 | x | 0 | | 25.00 | r | 6673292.07 | 1865642.85 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673292.92 | 1865576.84 | 1449.00 | 1422.60 |
| | | | | | | | | | 6673314.29 | 1865577.10 | 1449.00 | 1422.45 |
| | | | | | | | | | 6673314.11 | 1865591.48 | 1449.00 | 1423.24 |
| | | | | | | | | | 6673319.38 | 1865591.53 | 1449.00 | 1423.25 |
| | | | | | | | | | 6673319.55 | 1865577.70 | 1449.00 | 1422.53 |
| | | | | | | | | | 6673344.73 | 1865578.01 | 1449.00 | 1423.14 |
| | | | | | | | | | 6673343.92 | 1865642.13 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673315.68 | 1865641.78 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673315.68 | 1865643.16 | 1449.00 | 1424.00 |
| | | | building_00022 | x | 0 | | 25.00 | r | 6673355.86 | 1865614.45 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673371.08 | 1865614.65 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673370.52 | 1865645.11 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673400.36 | 1865645.40 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673400.55 | 1865594.27 | 1449.00 | 1423.36 |
| | | | | | | | | | 6673380.54 | 1865594.49 | 1449.00 | 1423.37 |
| | | | | | | | | | 6673380.92 | 1865573.82 | 1449.00 | 1422.69 |
| | | | | | | | | | 6673356.46 | 1865573.58 | 1449.00 | 1422.67 |
| | | | building_00023 | x | 0 | | 25.00 | r | 6673417.27 | 1865649.14 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673470.05 | 1865649.95 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673470.60 | 1865616.40 | 1449.00 | 1423.85 |
| | | | | | | | | | 6673451.44 | 1865616.11 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673451.67 | 1865601.22 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673444.83 | 1865601.13 | 1449.00 | 1423.98 |
| | | | | | | | | | 6673445.22 | 1865578.31 | 1449.00 | 1423.24 |
| | | | | | | | | | 6673418.41 | 1865577.88 | 1449.00 | 1422.94 |
| | | | building_00024 | x | 0 | | 25.00 | r | 6673481.13 | 1865649.77 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673534.82 | 1865650.37 | 1449.00 | 1423.66 |
| | | | | | | | | | 6673535.18 | 1865617.43 | 1449.00 | 1423.62 |
| | | | | | | | | | 6673514.54 | 1865617.21 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673514.76 | 1865600.40 | 1449.00 | 1423.84 |
| | | | | | | | | | 6673508.64 | 1865600.31 | 1449.00 | 1423.72 |
| | | | | | | | | | 6673508.88 | 1865577.96 | 1449.00 | 1422.52 |
| | | | | | | | | | 6673481.91 | 1865577.68 | 1449.00 | 1422.64 |
| | | | building_00025 | x | 0 | | 25.00 | r | 6673544.86 | 1865654.08 | 1448.40 | 1423.40 |
| | | | | | | | | | 6673545.04 | 1865620.96 | 1448.40 | 1423.42 |
| | | | | | | | | | 6673565.23 | 1865621.08 | 1448.40 | 1423.03 |
| | | | | | | | | | 6673565.32 | 1865604.41 | 1448.40 | 1422.95 |
| | | | | | | | | | 6673570.86 | 1865604.43 | 1448.40 | 1422.78 |
| | | | | | | | | | 6673570.97 | 1865580.59 | 1448.40 | 1422.02 |
| | | | | | | | | | 6673597.76 | 1865580.76 | 1448.40 | 1420.67 |
| | | | | | | | | | 6673597.34 | 1865654.38 | 1448.40 | 1424.14 |
| | | | building_00026 | x | 0 | | 25.00 | r | 6673633.28 | 1865675.33 | 1450.57 | 1425.57 |
| | | | | | | | | | 6673682.46 | 1865675.62 | 1450.57 | 1426.00 |
| | | | | | | | | | 6673682.75 | 1865630.10 | 1450.57 | 1425.42 |
| | | | | | | | | | 6673651.00 | 1865629.91 | 1450.57 | 1423.86 |
| | | | | | | | | | 6673651.06 | 1865622.52 | 1450.57 | 1423.39 |
| | | | | | | | | | 6673624.73 | 1865622.35 | 1450.57 | 1423.36 |
| | | | | | | | | | 6673624.59 | 1865644.26 | 1450.57 | 1424.30 |
| | | | | | | | | | 6673627.19 | 1865644.27 | 1450.57 | 1424.28 |
| | | | | | | | | | 6673627.09 | 1865661.92 | 1450.57 | 1425.02 |
| | | | | | | | | | 6673633.36 | 1865661.98 | 1450.57 | 1425.03 |
| | | | building_00027 | x | 0 | | 25.00 | r | 6673670.68 | 1865604.54 | 1447.23 | 1422.23 |
| | | | | | | | | | 6673730.52 | 1865605.34 | 1447.23 | 1421.64 |
| | | | | | | | | | 6673730.97 | 1865573.32 | 1447.23 | 1420.17 |
| | | | | | | | | | 6673692.89 | 1865572.78 | 1447.23 | 1419.96 |
| | | | | | | | | | 6673692.97 | 1865566.59 | 1447.23 | 1419.62 |
| | | | | | | | | | 6673671.18 | 1865566.29 | 1447.23 | 1419.87 |
| | | | building_00028 | x | 0 | | 25.00 | r | 6673738.11 | 1865607.26 | 1446.38 | 1421.38 |
| | | | | | | | | | 6673738.38 | 1865574.51 | 1446.38 | 1420.26 |
| | | | | | | | | | 6673769.76 | 1865574.95 | 1446.38 | 1420.04 |
| | | | | | | | | | 6673769.94 | 1865566.84 | 1446.38 | 1419.59 |
| | | | | | | | | | 6673802.72 | 1865566.96 | 1446.38 | 1420.52 |
| | | | | | | | | | 6673802.64 | 1865590.07 | 1446.38 | 1421.48 |
| | | | | | | | | | 6673787.42 | 1865589.69 | 1446.38 | 1421.11 |
| | | | | | | | | | 6673787.02 | 1865607.92 | 1446.38 | 1421.71 |
| | | | building_00029 | x | 0 | | 25.00 | r | 6673849.38 | 1865611.46 | 1447.61 | 1422.60 |
| | | | | | | | | | 6673907.22 | 1865611.67 | 1447.61 | 1421.39 |
| | | | | | | | | | 6673907.34 | 1865579.50 | 1447.61 | 1420.58 |
| | | | | | | | | | 6673871.20 | 1865579.37 | 1447.61 | 1420.14 |
| | | | | | | | | | 6673871.25 | 1865567.87 | 1447.61 | 1419.38 |
| | | | | | | | | | 6673849.54 | 1865567.79 | 1447.61 | 1419.31 |
| | | | building_00030 | x | 0 | | 25.00 | r | 6673856.43 | 1865671.75 | 1448.50 | 1423.50 |
| | | | | | | | | | 6673857.15 | 1865623.46 | 1448.50 | 1422.79 |
| | | | | | | | | | 6673890.29 | 1865623.95 | 1448.50 | 1422.03 |
| | | | | | | | | | 6673890.05 | 1865640.47 | 1448.50 | 1422.38 |
| | | | | | | | | | 6673885.39 | 1865640.41 | 1448.50 | 1422.45 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6673885.18 | 1865655.55 | 1448.50 | 1422.67 |
| | | | | | | | | | 6673908.27 | 1865655.89 | 1448.50 | 1422.15 |
| | | | | | | | | | 6673907.95 | 1865678.38 | 1448.50 | 1422.08 |
| | | | | | | | | | 6673875.53 | 1865677.90 | 1448.50 | 1422.98 |
| | | | | | | | | | 6673875.61 | 1865672.04 | 1448.50 | 1422.95 |
| | | | building_00031 | x | 0 | | 25.00 | r | 6674034.11 | 1865691.69 | 1446.16 | 1421.16 |
| | | | | | | | | | 6674034.50 | 1865668.70 | 1446.16 | 1420.80 |
| | | | | | | | | | 6674051.45 | 1865668.98 | 1446.16 | 1420.46 |
| | | | | | | | | | 6674051.60 | 1865660.32 | 1446.16 | 1420.22 |
| | | | | | | | | | 6674057.78 | 1865660.41 | 1446.16 | 1420.07 |
| | | | | | | | | | 6674057.89 | 1865653.75 | 1446.16 | 1419.82 |
| | | | | | | | | | 6674053.87 | 1865653.66 | 1446.16 | 1419.98 |
| | | | | | | | | | 6674054.21 | 1865633.61 | 1446.16 | 1419.49 |
| | | | | | | | | | 6674085.81 | 1865634.17 | 1446.16 | 1419.00 |
| | | | | | | | | | 6674085.00 | 1865681.98 | 1446.16 | 1420.43 |
| | | | | | | | | | 6674069.41 | 1865681.71 | 1446.16 | 1420.37 |
| | | | | | | | | | 6674069.30 | 1865687.60 | 1446.16 | 1420.79 |
| | | | | | | | | | 6674053.38 | 1865687.32 | 1446.16 | 1420.96 |
| | | | | | | | | | 6674053.30 | 1865692.02 | 1446.16 | 1421.10 |
| | | | building_00059 | x | 0 | | 25.00 | r | 6672804.48 | 1865472.14 | 1446.53 | 1421.53 |
| | | | | | | | | | 6672857.08 | 1865472.44 | 1446.53 | 1421.72 |
| | | | | | | | | | 6672857.16 | 1865460.76 | 1446.53 | 1421.52 |
| | | | | | | | | | 6672865.69 | 1865460.82 | 1446.53 | 1421.17 |
| | | | | | | | | | 6672865.91 | 1865426.22 | 1446.53 | 1420.22 |
| | | | | | | | | | 6672830.47 | 1865425.98 | 1446.53 | 1419.94 |
| | | | | | | | | | 6672830.38 | 1865440.90 | 1446.53 | 1420.61 |
| | | | | | | | | | 6672804.69 | 1865440.73 | 1446.53 | 1419.79 |
| | | | building_00060 | x | 0 | | 25.00 | r | 6672706.64 | 1865458.39 | 1448.93 | 1423.93 |
| | | | | | | | | | 6672739.30 | 1865458.94 | 1448.93 | 1424.00 |
| | | | | | | | | | 6672740.14 | 1865410.29 | 1448.93 | 1420.00 |
| | | | | | | | | | 6672698.86 | 1865409.56 | 1448.93 | 1421.55 |
| | | | | | | | | | 6672698.36 | 1865438.12 | 1448.93 | 1423.33 |
| | | | | | | | | | 6672701.94 | 1865438.17 | 1448.93 | 1423.29 |
| | | | | | | | | | 6672701.78 | 1865448.51 | 1448.93 | 1423.86 |
| | | | | | | | | | 6672706.83 | 1865448.60 | 1448.93 | 1423.84 |
| | | | building_00063 | x | 0 | | 25.00 | r | 6672525.70 | 1865467.81 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672566.17 | 1865467.81 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672566.19 | 1865446.16 | 1449.00 | 1423.96 |
| | | | | | | | | | 6672584.32 | 1865446.15 | 1449.00 | 1423.64 |
| | | | | | | | | | 6672584.34 | 1865414.78 | 1449.00 | 1423.00 |
| | | | | | | | | | 6672557.98 | 1865414.76 | 1449.00 | 1422.78 |
| | | | | | | | | | 6672557.97 | 1865417.99 | 1449.00 | 1422.89 |
| | | | | | | | | | 6672525.70 | 1865417.99 | 1449.00 | 1424.04 |
| | | | building_00064 | x | 0 | | 25.00 | r | 6672409.94 | 1865464.95 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672410.37 | 1865437.07 | 1449.00 | 1423.64 |
| | | | | | | | | | 6672424.50 | 1865437.31 | 1449.00 | 1423.81 |
| | | | | | | | | | 6672424.86 | 1865415.58 | 1449.00 | 1423.35 |
| | | | | | | | | | 6672457.33 | 1865416.10 | 1449.00 | 1423.83 |
| | | | | | | | | | 6672456.52 | 1865465.66 | 1449.00 | 1424.72 |
| | | | building_00066 | x | 0 | | 25.00 | r | 6672235.14 | 1865464.64 | 1448.94 | 1423.94 |
| | | | | | | | | | 6672267.04 | 1865464.72 | 1448.94 | 1423.84 |
| | | | | | | | | | 6672267.11 | 1865444.99 | 1448.94 | 1423.45 |
| | | | | | | | | | 6672281.55 | 1865445.01 | 1448.94 | 1423.32 |
| | | | | | | | | | 6672281.63 | 1865416.26 | 1448.94 | 1422.51 |
| | | | | | | | | | 6672235.29 | 1865416.13 | 1448.94 | 1423.27 |
| | | | building_00070 | x | 0 | | 25.00 | r | 6672099.34 | 1865452.28 | 1449.57 | 1424.57 |
| | | | | | | | | | 6672099.82 | 1865413.27 | 1449.57 | 1424.00 |
| | | | | | | | | | 6672158.93 | 1865414.00 | 1449.57 | 1424.13 |
| | | | | | | | | | 6672158.46 | 1865452.72 | 1449.57 | 1423.25 |
| | | | | | | | | | 6672144.11 | 1865452.55 | 1449.57 | 1424.00 |
| | | | | | | | | | 6672143.98 | 1865463.47 | 1449.57 | 1424.25 |
| | | | | | | | | | 6672103.97 | 1865463.00 | 1449.57 | 1424.87 |
| | | | | | | | | | 6672104.10 | 1865452.34 | 1449.57 | 1424.61 |
| | | | building_00071 | x | 0 | | 25.00 | r | 6671915.49 | 1865462.42 | 1448.99 | 1423.99 |
| | | | | | | | | | 6671947.51 | 1865462.39 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671947.50 | 1865465.45 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671974.44 | 1865465.44 | 1448.99 | 1423.92 |
| | | | | | | | | | 6671974.41 | 1865439.53 | 1448.99 | 1423.36 |
| | | | | | | | | | 6671954.65 | 1865439.53 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671954.60 | 1865411.54 | 1448.99 | 1423.75 |
| | | | | | | | | | 6671915.43 | 1865411.58 | 1448.99 | 1423.38 |
| | | | building_00074 | x | 0 | | 25.00 | r | 6671805.75 | 1865459.62 | 1450.21 | 1425.21 |
| | | | | | | | | | 6671837.83 | 1865460.10 | 1450.21 | 1426.00 |
| | | | | | | | | | 6671838.56 | 1865410.58 | 1450.21 | 1424.31 |
| | | | | | | | | | 6671792.34 | 1865409.86 | 1450.21 | 1426.00 |
| | | | | | | | | | 6671791.90 | 1865438.65 | 1450.21 | 1425.54 |
| | | | | | | | | | 6671806.07 | 1865438.88 | 1450.21 | 1425.70 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00075 | x | 0 | | 25.00 | r | 6671612.98 | 1865458.24 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671613.19 | 1865434.18 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671627.87 | 1865434.31 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671628.11 | 1865407.96 | 1451.00 | 1425.38 |
| | | | | | | | | | 6671683.26 | 1865408.45 | 1451.00 | 1424.45 |
| | | | | | | | | | 6671683.05 | 1865434.14 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671661.68 | 1865433.96 | 1451.00 | 1425.34 |
| | | | | | | | | | 6671661.58 | 1865445.60 | 1451.00 | 1425.08 |
| | | | | | | | | | 6671666.48 | 1865445.62 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671666.33 | 1865462.43 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671627.62 | 1865462.07 | 1451.00 | 1425.18 |
| | | | | | | | | | 6671627.66 | 1865458.36 | 1451.00 | 1425.56 |
| | | | building_00077 | x | 0 | | 25.00 | r | 6670694.99 | 1865662.33 | 1452.00 | 1427.00 |
| | | | | | | | | | 6670716.11 | 1865662.77 | 1452.00 | 1427.00 |
| | | | | | | | | | 6670716.33 | 1865652.00 | 1452.00 | 1427.09 |
| | | | | | | | | | 6670738.09 | 1865652.44 | 1452.00 | 1427.03 |
| | | | | | | | | | 6670739.02 | 1865605.90 | 1452.00 | 1428.48 |
| | | | | | | | | | 6670696.13 | 1865605.05 | 1452.00 | 1428.87 |
| | | | building_00078 | x | 0 | | 25.00 | r | 6670745.40 | 1865631.72 | 1453.05 | 1428.05 |
| | | | | | | | | | 6670745.94 | 1865590.17 | 1453.05 | 1428.74 |
| | | | | | | | | | 6670788.83 | 1865590.76 | 1453.05 | 1428.73 |
| | | | | | | | | | 6670788.24 | 1865636.06 | 1453.05 | 1427.72 |
| | | | | | | | | | 6670770.87 | 1865635.86 | 1453.05 | 1428.03 |
| | | | | | | | | | 6670770.91 | 1865632.07 | 1453.05 | 1428.10 |
| | | | building_00079 | x | 0 | | 25.00 | r | 6670795.76 | 1865624.08 | 1453.08 | 1428.08 |
| | | | | | | | | | 6670796.42 | 1865576.77 | 1453.08 | 1428.88 |
| | | | | | | | | | 6670838.43 | 1865577.32 | 1453.08 | 1428.09 |
| | | | | | | | | | 6670837.89 | 1865616.08 | 1453.08 | 1428.00 |
| | | | | | | | | | 6670818.04 | 1865615.79 | 1453.08 | 1428.00 |
| | | | | | | | | | 6670817.92 | 1865624.38 | 1453.08 | 1428.00 |
| | | | building_00080 | x | 0 | | 25.00 | r | 6670845.78 | 1865611.45 | 1453.00 | 1428.00 |
| | | | | | | | | | 6670846.23 | 1865570.04 | 1453.00 | 1428.00 |
| | | | | | | | | | 6670888.76 | 1865570.48 | 1453.00 | 1428.48 |
| | | | | | | | | | 6670888.26 | 1865616.41 | 1453.00 | 1428.18 |
| | | | | | | | | | 6670871.16 | 1865616.24 | 1453.00 | 1428.14 |
| | | | | | | | | | 6670871.20 | 1865611.72 | 1453.00 | 1428.24 |
| | | | building_00081 | x | 0 | | 25.00 | r | 6670896.12 | 1865619.38 | 1453.14 | 1428.14 |
| | | | | | | | | | 6670917.82 | 1865619.57 | 1453.14 | 1428.16 |
| | | | | | | | | | 6670917.91 | 1865610.54 | 1453.14 | 1428.45 |
| | | | | | | | | | 6670938.28 | 1865610.73 | 1453.14 | 1428.74 |
| | | | | | | | | | 6670938.60 | 1865573.50 | 1453.14 | 1428.67 |
| | | | | | | | | | 6670896.52 | 1865573.13 | 1453.14 | 1428.66 |
| | | | building_00082 | x | 0 | | 25.00 | r | 6670945.37 | 1865608.68 | 1453.82 | 1428.82 |
| | | | | | | | | | 6670945.99 | 1865561.41 | 1453.82 | 1428.15 |
| | | | | | | | | | 6670989.21 | 1865561.96 | 1453.82 | 1426.59 |
| | | | | | | | | | 6670988.46 | 1865619.68 | 1453.82 | 1428.64 |
| | | | | | | | | | 6670967.37 | 1865619.42 | 1453.82 | 1428.00 |
| | | | | | | | | | 6670967.49 | 1865608.94 | 1453.82 | 1428.13 |
| | | | building_00083 | x | 0 | | 25.00 | r | 6670995.77 | 1865608.68 | 1453.71 | 1428.71 |
| | | | | | | | | | 6670996.27 | 1865561.92 | 1453.71 | 1426.72 |
| | | | | | | | | | 6671039.37 | 1865562.40 | 1453.71 | 1428.43 |
| | | | | | | | | | 6671038.79 | 1865613.13 | 1453.71 | 1428.92 |
| | | | | | | | | | 6671030.89 | 1865613.02 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671029.73 | 1865615.35 | 1453.71 | 1428.94 |
| | | | | | | | | | 6671027.45 | 1865617.45 | 1453.71 | 1428.86 |
| | | | | | | | | | 6671024.21 | 1865618.35 | 1453.71 | 1428.86 |
| | | | | | | | | | 6671021.10 | 1865617.54 | 1453.71 | 1428.94 |
| | | | | | | | | | 6671018.90 | 1865615.31 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671017.88 | 1865611.85 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671018.98 | 1865608.98 | 1453.71 | 1429.00 |
| | | | building_00084 | x | 0 | | 25.00 | r | 6671045.57 | 1865621.56 | 1453.63 | 1428.63 |
| | | | | | | | | | 6671045.73 | 1865560.16 | 1453.63 | 1428.66 |
| | | | | | | | | | 6671069.61 | 1865560.21 | 1453.63 | 1429.90 |
| | | | | | | | | | 6671069.60 | 1865572.77 | 1453.63 | 1429.91 |
| | | | | | | | | | 6671088.57 | 1865572.80 | 1453.63 | 1430.00 |
| | | | | | | | | | 6671088.49 | 1865612.32 | 1453.63 | 1429.74 |
| | | | | | | | | | 6671068.27 | 1865612.25 | 1453.63 | 1429.00 |
| | | | | | | | | | 6671068.24 | 1865621.64 | 1453.63 | 1429.00 |
| | | | building_00085 | x | 0 | | 25.00 | r | 6671095.37 | 1865609.65 | 1454.92 | 1429.92 |
| | | | | | | | | | 6671095.63 | 1865563.33 | 1454.92 | 1430.00 |
| | | | | | | | | | 6671138.55 | 1865563.55 | 1454.92 | 1430.00 |
| | | | | | | | | | 6671138.25 | 1865620.40 | 1454.92 | 1429.05 |
| | | | | | | | | | 6671117.76 | 1865620.29 | 1454.92 | 1429.00 |
| | | | | | | | | | 6671117.80 | 1865609.77 | 1454.92 | 1429.27 |
| | | | building_00086 | x | 0 | | 25.00 | r | 6671145.90 | 1865615.04 | 1454.27 | 1429.27 |
| | | | | | | | | | 6671146.02 | 1865573.26 | 1454.27 | 1430.00 |
| | | | | | | | | | 6671188.79 | 1865573.34 | 1454.27 | 1430.00 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6671188.71 | 1865612.72 | 1454.27 | 1429.43 |
| | | | | | | | | | 6671167.82 | 1865612.68 | 1454.27 | 1429.39 |
| | | | | | | | | | 6671166.56 | 1865618.94 | 1454.27 | 1429.26 |
| | | | | | | | | | 6671161.19 | 1865621.28 | 1454.27 | 1429.23 |
| | | | | | | | | | 6671155.57 | 1865619.04 | 1454.27 | 1429.24 |
| | | | | | | | | | 6671154.31 | 1865615.07 | 1454.27 | 1429.33 |
| | | | building_00087 | x | 0 | | 25.00 | r | 6671195.80 | 1865610.60 | 1454.52 | 1429.52 |
| | | | | | | | | | 6671196.15 | 1865564.20 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671239.34 | 1865564.50 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671238.92 | 1865621.42 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671218.16 | 1865621.27 | 1454.52 | 1429.86 |
| | | | | | | | | | 6671218.22 | 1865610.75 | 1454.52 | 1429.94 |
| | | | building_00088 | x | 0 | | 25.00 | r | 6671245.44 | 1865619.00 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671245.87 | 1865573.22 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671289.18 | 1865573.60 | 1455.00 | 1430.85 |
| | | | | | | | | | 6671288.79 | 1865614.97 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671264.34 | 1865614.74 | 1455.00 | 1430.06 |
| | | | | | | | | | 6671264.29 | 1865619.18 | 1455.00 | 1430.00 |
| | | | building_00089 | x | 0 | | 25.00 | r | 6671295.58 | 1865614.01 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671295.72 | 1865574.49 | 1455.00 | 1430.86 |
| | | | | | | | | | 6671338.58 | 1865574.65 | 1455.00 | 1431.00 |
| | | | | | | | | | 6671338.42 | 1865617.12 | 1455.00 | 1430.34 |
| | | | | | | | | | 6671329.98 | 1865617.09 | 1455.00 | 1430.29 |
| | | | | | | | | | 6671327.21 | 1865621.26 | 1455.00 | 1430.20 |
| | | | | | | | | | 6671323.06 | 1865622.45 | 1455.00 | 1430.18 |
| | | | | | | | | | 6671318.74 | 1865621.12 | 1455.00 | 1430.14 |
| | | | | | | | | | 6671316.48 | 1865617.95 | 1455.00 | 1430.17 |
| | | | | | | | | | 6671316.37 | 1865614.09 | 1455.00 | 1430.25 |
| | | | building_00090 | x | 0 | | 25.00 | r | 6671345.76 | 1865622.02 | 1455.31 | 1430.31 |
| | | | | | | | | | 6671366.46 | 1865622.20 | 1455.31 | 1430.51 |
| | | | | | | | | | 6671366.53 | 1865611.94 | 1455.31 | 1430.95 |
| | | | | | | | | | 6671388.69 | 1865612.13 | 1455.31 | 1431.10 |
| | | | | | | | | | 6671389.06 | 1865565.99 | 1455.31 | 1431.67 |
| | | | | | | | | | 6671346.21 | 1865565.61 | 1455.31 | 1430.89 |
| | | | building_00091 | x | 0 | | 25.00 | r | 6671396.28 | 1865613.29 | 1456.11 | 1431.11 |
| | | | | | | | | | 6671396.04 | 1865571.72 | 1456.11 | 1431.83 |
| | | | | | | | | | 6671438.53 | 1865571.44 | 1456.11 | 1431.00 |
| | | | | | | | | | 6671438.82 | 1865617.70 | 1456.11 | 1430.23 |
| | | | | | | | | | 6671420.66 | 1865617.78 | 1456.11 | 1431.00 |
| | | | | | | | | | 6671420.62 | 1865613.15 | 1456.11 | 1431.00 |
| | | | building_00092 | x | 0 | | 25.00 | r | 6671513.11 | 1865587.80 | 1456.81 | 1431.81 |
| | | | | | | | | | 6671560.00 | 1865588.22 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671560.39 | 1865545.53 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671522.14 | 1865545.18 | 1456.81 | 1431.79 |
| | | | | | | | | | 6671521.94 | 1865565.48 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671513.35 | 1865565.38 | 1456.81 | 1432.00 |
| | | | building_00093 | x | 0 | | 25.00 | r | 6671514.44 | 1865638.35 | 1457.00 | 1432.00 |
| | | | | | | | | | 6671557.76 | 1865638.61 | 1457.00 | 1432.04 |
| | | | | | | | | | 6671558.03 | 1865595.27 | 1457.00 | 1432.00 |
| | | | | | | | | | 6671500.62 | 1865594.88 | 1457.00 | 1431.50 |
| | | | | | | | | | 6671500.48 | 1865616.61 | 1457.00 | 1431.66 |
| | | | | | | | | | 6671514.58 | 1865616.70 | 1457.00 | 1432.00 |
| | | | building_00094 | x | 0 | | 25.00 | r | 6671505.34 | 1865687.45 | 1457.36 | 1432.35 |
| | | | | | | | | | 6671555.82 | 1865688.03 | 1457.36 | 1433.42 |
| | | | | | | | | | 6671556.34 | 1865645.34 | 1457.36 | 1432.19 |
| | | | | | | | | | 6671513.54 | 1865644.82 | 1457.36 | 1432.00 |
| | | | | | | | | | 6671513.28 | 1865667.68 | 1457.36 | 1432.41 |
| | | | | | | | | | 6671505.62 | 1865667.58 | 1457.36 | 1432.28 |
| | | | | | | | | | 6671502.04 | 1865669.46 | 1457.36 | 1432.23 |
| | | | | | | | | | 6671500.55 | 1865673.34 | 1457.36 | 1432.22 |
| | | | | | | | | | 6671502.01 | 1865678.15 | 1457.36 | 1432.26 |
| | | | | | | | | | 6671505.52 | 1865679.95 | 1457.36 | 1432.33 |
| | | | building_00095 | x | 0 | | 25.00 | r | 6671506.52 | 1865737.67 | 1457.47 | 1432.47 |
| | | | | | | | | | 6671545.26 | 1865738.21 | 1457.47 | 1433.26 |
| | | | | | | | | | 6671545.87 | 1865695.93 | 1457.47 | 1433.00 |
| | | | | | | | | | 6671498.92 | 1865695.25 | 1457.47 | 1432.28 |
| | | | | | | | | | 6671498.60 | 1865717.70 | 1457.47 | 1432.34 |
| | | | | | | | | | 6671506.80 | 1865717.80 | 1457.47 | 1432.50 |

# APPENDIX H

# CONSTRUCTION NOISE LEVEL CALCULATIONS

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# 14896 - Upland Colonies

**CadnaA Noise Prediction Model:** 14896-05_Construction.cna
**Date:** 26.09.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.01 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 999.99 |
| Min. Length of Section (#(Unit,LEN)) | 1.01 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 5.00 |
| Night-time Penalty (dB) | 10.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Incl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.50 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (FTA/FRA) | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

## Receiver Noise Levels

| Name | M. | ID | Level Lr | | | Limit. Value | | | Land Use | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Night | CNEL | Day | Night | CNEL | Type | Auto | Noise Type | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | | (ft) | | (ft) | (ft) | (ft) |
| RECEIVERS_PROJECT | | R01 | 55.0 | 55.0 | 61.7 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671896.97 | 1865987.11 | 1450.48 |
| RECEIVERS_PROJECT | | R02 | 56.6 | 56.6 | 63.2 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672638.61 | 1866083.69 | 1456.10 |
| RECEIVERS_PROJECT | | R03 | 50.7 | 50.7 | 57.4 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6674316.74 | 1866075.19 | 1442.47 |
| RECEIVERS_PROJECT | | R04 | 53.6 | 53.6 | 60.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6674091.06 | 1865672.75 | 1424.43 |
| RECEIVERS_PROJECT | | R05 | 55.3 | 55.3 | 62.0 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6673112.65 | 1865658.17 | 1430.08 |
| RECEIVERS_PROJECT | | R06 | 58.1 | 58.1 | 64.8 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672851.26 | 1865667.38 | 1433.04 |
| RECEIVERS_PROJECT | | R07 | 56.8 | 56.8 | 63.5 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6672469.26 | 1865460.53 | 1429.93 |
| RECEIVERS_PROJECT | | R08 | 56.6 | 56.6 | 63.3 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671593.21 | 1865440.98 | 1431.04 |
| RECEIVERS_PROJECT | | R09 | 53.3 | 53.3 | 59.9 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671032.11 | 1865560.27 | 1432.93 |
| RECEIVERS_PROJECT | | R10 | 52.2 | 52.2 | 58.8 | 80.0 | 0.0 | 0.0 | | | | 5.00 | r | 6671559.70 | 1865658.81 | 1437.40 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Operating Time | | | Height |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | (ft) |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | |
| SITEBOUNDARY_PROJECT | | CONSTRUCTION | 115.0 | 115.0 | 115.0 | 66.4 | 66.4 | 66.4 | Lw | 115 | | | | | 8 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY_PROJECT | CONSTRUCTION | 8.00 | r | | | 6671573.29 | 1865534.78 | 1437.59 | 1429.59 |
| | | | | | | 6671571.14 | 1865773.41 | 1443.96 | 1435.96 |
| | | | | | | 6671816.13 | 1865773.36 | 1442.13 | 1434.13 |
| | | | | | | 6671816.15 | 1865787.35 | 1443.11 | 1435.11 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6671838.70 | 1865809.35 | 1443.98 | 1435.98 |
| | | | | 6671849.42 | 1865798.07 | 1443.46 | 1435.46 |
| | | | | 6671861.55 | 1865797.31 | 1443.71 | 1435.71 |
| | | | | 6671862.59 | 1865779.23 | 1442.32 | 1434.32 |
| | | | | 6671887.76 | 1865779.46 | 1443.13 | 1435.13 |
| | | | | 6671888.33 | 1865772.13 | 1442.24 | 1434.24 |
| | | | | 6672440.94 | 1865775.51 | 1441.00 | 1433.00 |
| | | | | 6672663.12 | 1865941.30 | 1442.86 | 1434.86 |
| | | | | 6673095.06 | 1865943.55 | 1439.71 | 1431.71 |
| | | | | 6673094.50 | 1865956.52 | 1441.00 | 1433.00 |
| | | | | 6673145.25 | 1865955.40 | 1440.47 | 1432.47 |
| | | | | 6673146.37 | 1865940.17 | 1438.83 | 1430.83 |
| | | | | 6673186.41 | 1865940.17 | 1441.00 | 1433.00 |
| | | | | 6673187.76 | 1865925.00 | 1438.07 | 1430.07 |
| | | | | 6674213.82 | 1865928.33 | 1437.41 | 1429.41 |
| | | | | 6674213.26 | 1865897.88 | 1430.94 | 1422.94 |
| | | | | 6674195.22 | 1865880.96 | 1427.71 | 1419.71 |
| | | | | 6674230.74 | 1865807.65 | 1427.91 | 1419.91 |
| | | | | 6674150.67 | 1865756.90 | 1432.00 | 1424.00 |
| | | | | 6674148.41 | 1865744.50 | 1432.00 | 1424.00 |
| | | | | 6675149.89 | 1865748.45 | 1443.59 | 1435.59 |
| | | | | 6675156.65 | 1865749.11 | 1444.20 | 1436.20 |
| | | | | 6675162.90 | 1865747.80 | 1444.98 | 1436.98 |
| | | | | 6675168.89 | 1865745.46 | 1446.40 | 1438.40 |
| | | | | 6675173.84 | 1865742.34 | 1447.77 | 1439.77 |
| | | | | 6675177.49 | 1865736.61 | 1449.40 | 1441.40 |
| | | | | 6675178.01 | 1865728.01 | 1449.88 | 1441.88 |
| | | | | 6675175.66 | 1865721.24 | 1449.38 | 1441.38 |
| | | | | 6675168.63 | 1865710.83 | 1447.11 | 1439.11 |
| | | | | 6675162.64 | 1865707.44 | 1445.30 | 1437.30 |
| | | | | 6675152.75 | 1865707.96 | 1443.27 | 1435.27 |
| | | | | 6675144.67 | 1865710.04 | 1442.54 | 1434.54 |
| | | | | 6675135.04 | 1865726.19 | 1442.41 | 1434.41 |
| | | | | 6675128.46 | 1865730.97 | 1442.62 | 1434.62 |
| | | | | 6673989.39 | 1865722.51 | 1432.00 | 1424.00 |
| | | | | 6673989.39 | 1865693.75 | 1429.77 | 1421.77 |
| | | | | 6673188.25 | 1865685.03 | 1436.34 | 1428.34 |
| | | | | 6672766.87 | 1865685.54 | 1437.41 | 1429.41 |
| | | | | 6672764.83 | 1865525.71 | 1431.00 | 1423.00 |
| | | | | 6671750.52 | 1865514.47 | 1431.68 | 1423.68 |
| | | | | 6671752.86 | 1865469.68 | 1431.10 | 1423.10 |
| | | | | 6671572.93 | 1865468.63 | 1433.17 | 1425.17 |
| | | | | 6671094.93 | 1865464.81 | 1435.00 | 1427.00 |
| | | | | 6670895.31 | 1865499.77 | 1428.00 | 1420.00 |
| | | | | 6670705.61 | 1865495.26 | 1430.69 | 1422.69 |
| | | | | 6670700.32 | 1865495.13 | 1430.78 | 1422.78 |
| | | | | 6670688.38 | 1865485.46 | 1431.00 | 1423.00 |
| | | | | 6670677.05 | 1865485.91 | 1431.00 | 1423.00 |
| | | | | 6670665.26 | 1865485.61 | 1430.83 | 1422.83 |
| | | | | 6670651.66 | 1865477.75 | 1430.81 | 1422.81 |
| | | | | 6670640.17 | 1865477.29 | 1430.94 | 1422.94 |
| | | | | 6670628.38 | 1865478.65 | 1431.03 | 1423.03 |
| | | | | 6670620.37 | 1865484.40 | 1431.09 | 1423.09 |
| | | | | 6670610.10 | 1865492.41 | 1431.06 | 1423.06 |
| | | | | 6670600.88 | 1865501.63 | 1430.72 | 1422.72 |
| | | | | 6670600.73 | 1865516.44 | 1430.30 | 1422.30 |
| | | | | 6670619.62 | 1865528.07 | 1430.00 | 1422.00 |
| | | | | 6670632.01 | 1865536.84 | 1430.00 | 1422.00 |
| | | | | 6670642.74 | 1865541.68 | 1430.00 | 1422.00 |
| | | | | 6670654.53 | 1865539.56 | 1430.00 | 1422.00 |
| | | | | 6670661.24 | 1865528.15 | 1430.11 | 1422.11 |
| | | | | 6670912.86 | 1865530.12 | 1433.16 | 1425.16 |

## Barrier(s)

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | End | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 r | | 6671504.85 | 1865535.28 | 1437.50 | 1431.50 |
| | | | | | | | | | | | 6671572.26 | 1865535.81 | 1435.97 | 1429.97 |
| | | | | | | | | | | | 6671570.61 | 1865735.80 | 1439.45 | 1433.45 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 r | | 6671435.02 | 1865592.39 | 1436.82 | 1430.82 |
| | | | | | | | | | | | 6671434.23 | 1865537.70 | 1437.13 | 1431.13 |
| | | | | | | | | | | | 6671225.90 | 1865537.18 | 1433.13 | 1427.13 |
| | | | | | | | | | | | 6670910.80 | 1865533.53 | 1431.73 | 1425.73 |
| | | | | | | | | | | | 6670877.72 | 1865548.64 | 1432.17 | 1426.17 |
| | | | | | | | | | | | 6670702.20 | 1865545.51 | 1432.17 | 1426.17 |

| Name | Sel. | M. | ID | Absorption | | Z-Ext. | Cantilever | | Height | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | left | right | | horz. | vert. | Begin | | End | x | y | z | Ground |
| | | | | | | (ft) | (ft) | (ft) | (ft) | | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | | | | 6670677.72 | 1865570.77 | 1432.46 | 1426.46 |
| | | | | | | | | | | | | 6670677.98 | 1865654.89 | 1433.27 | 1427.27 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671572.96 | 1865279.53 | 291.20 | 285.20 |
| | | | | | | | | | | | | 6671570.82 | 1865467.27 | 1431.27 | 1425.27 |
| | | | | | | | | | | | | 6671641.57 | 1865468.35 | 1430.07 | 1424.07 |
| | | | | | | | | | | | | 6671641.57 | 1865461.19 | 1430.85 | 1424.85 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671798.25 | 1865457.72 | 1431.16 | 1425.16 |
| | | | | | | | | | | | | 6671798.25 | 1865473.34 | 1429.99 | 1423.99 |
| | | | | | | | | | | | | 6672132.02 | 1865474.86 | 1431.00 | 1425.00 |
| | | | | | | | | | | | | 6672420.00 | 1865477.47 | 1430.00 | 1424.00 |
| | | | | | | | | | | | | 6672556.50 | 1865477.47 | 1430.00 | 1424.00 |
| | | | | | | | | | | | | 6672556.50 | 1865462.71 | 1430.00 | 1424.00 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6672700.81 | 1865455.76 | 1429.94 | 1423.94 |
| | | | | | | | | | | | | 6672701.90 | 1865478.55 | 1429.45 | 1423.45 |
| | | | | | | | | | | | | 6672830.80 | 1865479.20 | 1428.00 | 1422.00 |
| | | | | | | | | | | | | 6672830.80 | 1865470.30 | 1427.79 | 1421.79 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6672998.99 | 1865471.17 | 1426.43 | 1420.43 |
| | | | | | | | | | | | | 6672998.77 | 1865482.67 | 1426.40 | 1420.40 |
| | | | | | | | | | | | | 6673061.49 | 1865482.89 | 1425.93 | 1419.93 |
| | | | | | | | | | | | | 6673060.62 | 1865413.45 | 1424.59 | 1418.59 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6674026.75 | 1865690.10 | 1427.05 | 1421.05 |
| | | | | | | | | | | | | 6674226.75 | 1865690.36 | 1427.03 | 1421.03 |
| | | | | | | | | | | | | 6674404.61 | 1865687.75 | 1427.33 | 1421.33 |
| | | | | | | | | | | | | 6674604.61 | 1865689.84 | 1430.82 | 1424.82 |
| | | | | | | | | | | | | 6674927.79 | 1865690.88 | 1431.65 | 1425.65 |
| | | | | | | | | | | | | 6675136.12 | 1865693.74 | 1439.33 | 1433.33 |
| | | | | | | | | | | | | 6675122.58 | 1865646.35 | 1435.17 | 1429.17 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671033.48 | 1865534.95 | 1432.81 | 1426.81 |
| | | | | | | | | | | | | 6671033.22 | 1865602.61 | 1435.12 | 1429.12 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671570.61 | 1865735.58 | 1439.44 | 1433.44 |
| | | | | | | | | | | | | 6671503.79 | 1865735.94 | 1438.42 | 1432.42 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671570.81 | 1865685.95 | 1440.00 | 1434.00 |
| | | | | | | | | | | | | 6671502.06 | 1865685.60 | 1438.30 | 1432.30 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671571.01 | 1865635.77 | 1437.60 | 1431.60 |
| | | | | | | | | | | | | 6671513.34 | 1865635.25 | 1438.00 | 1432.00 |
| BARRIEREXISTING_PROJECT | | | 0 | | | | | | 6.00 | r | | 6671571.21 | 1865585.95 | 1438.00 | 1432.00 |
| | | | | | | | | | | | | 6671516.29 | 1865585.08 | 1437.91 | 1431.91 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6672769.14 | 1865568.14 | 1433.00 | 1425.00 |
| | | | | | | | | | | | | 6672771.68 | 1865681.93 | 1436.97 | 1428.97 |
| | | | | | | | | | | | | 6673096.16 | 1865683.23 | 1437.94 | 1429.94 |
| | | | | | | | | | | | | 6673355.79 | 1865686.10 | 1436.35 | 1428.35 |
| | | | | | | | | | | | | 6673595.12 | 1865688.44 | 1434.56 | 1426.56 |
| | | | | | | | | | | | | 6673897.72 | 1865690.78 | 1430.70 | 1422.70 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6671433.92 | 1865536.36 | 1439.05 | 1431.05 |
| | | | | | | | | | | | | 6671283.92 | 1865535.84 | 1435.35 | 1427.35 |
| | | | | | | | | | | | | 6671039.39 | 1865533.75 | 1435.01 | 1427.01 |
| | | | | | | | | | | | | 6670909.96 | 1865532.45 | 1433.53 | 1425.53 |
| | | | | | | | | | | | | 6670774.54 | 1865531.15 | 1431.28 | 1423.28 |
| | | | | | | | | | | | | 6670663.35 | 1865530.11 | 1430.20 | 1422.20 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 12.00 | r | | 6671570.61 | 1865735.58 | 1445.44 | 1433.44 |
| | | | | | | | | | | | | 6671571.41 | 1865535.80 | 1442.07 | 1430.07 |
| | | | | | | | | | | | | 6671482.37 | 1865535.10 | 1442.84 | 1430.84 |
| BARRIERTEMP_PROJECT | | | 0 | | | | | | 8.00 | r | | 6671471.07 | 1865467.02 | 1435.00 | 1427.00 |
| | | | | | | | | | | | | 6671572.13 | 1865468.13 | 1433.25 | 1425.25 |
| | | | | | | | | | | | | 6671641.21 | 1865468.35 | 1432.08 | 1424.08 |

## Building(s)

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00002 | x | 0 | | 25.00 | r | 6674267.11 | 1865618.82 | 1443.01 | 1418.01 |
| | | | | | | | | | 6674357.09 | 1865652.60 | 1443.01 | 1419.32 |
| | | | | | | | | | 6674398.74 | 1865571.49 | 1443.01 | 1422.00 |
| | | | | | | | | | 6674286.52 | 1865526.39 | 1443.01 | 1418.45 |
| | | | | | | | | | 6674255.86 | 1865600.51 | 1443.01 | 1418.19 |
| | | | building_00003 | x | 0 | | 25.00 | r | 6674429.92 | 1865642.32 | 1446.75 | 1421.75 |
| | | | | | | | | | 6674432.11 | 1865622.60 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674422.91 | 1865624.35 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674429.56 | 1865552.61 | 1446.75 | 1422.00 |
| | | | | | | | | | 6674551.76 | 1865566.09 | 1446.75 | 1423.94 |
| | | | | | | | | | 6674543.39 | 1865635.35 | 1446.75 | 1423.73 |
| | | | | | | | | | 6674532.77 | 1865634.95 | 1446.75 | 1423.21 |
| | | | | | | | | | 6674530.25 | 1865652.88 | 1446.75 | 1422.76 |
| | | | building_00004 | x | 0 | | 25.00 | r | 6674560.98 | 1865650.88 | 1448.40 | 1423.40 |
| | | | | | | | | | 6674560.96 | 1865565.40 | 1448.40 | 1424.00 |
| | | | | | | | | | 6674680.77 | 1865564.79 | 1448.40 | 1424.63 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6674683.25 | 1865653.45 | 1448.40 | 1425.00 |
| | | | building_00005 | x | 0 | | 25.00 | r | 6674699.14 | 1865654.20 | 1450.00 | 1425.00 |
| | | | | | | | | | 6674699.46 | 1865566.64 | 1450.00 | 1424.78 |
| | | | | | | | | | 6674821.39 | 1865563.56 | 1450.00 | 1426.00 |
| | | | | | | | | | 6674818.24 | 1865654.31 | 1450.00 | 1424.07 |
| | | | building_00006 | x | 0 | | 25.00 | r | 6674832.71 | 1865655.42 | 1449.02 | 1424.02 |
| | | | | | | | | | 6674829.86 | 1865564.65 | 1449.02 | 1425.78 |
| | | | | | | | | | 6674948.98 | 1865560.87 | 1449.02 | 1424.00 |
| | | | | | | | | | 6674950.06 | 1865652.69 | 1449.02 | 1424.00 |
| | | | building_00007 | x | 0 | | 25.00 | r | 6674961.67 | 1865567.61 | 1449.00 | 1424.00 |
| | | | | | | | | | 6674983.22 | 1865478.68 | 1449.00 | 1422.56 |
| | | | | | | | | | 6675070.76 | 1865502.22 | 1449.00 | 1421.67 |
| | | | | | | | | | 6675048.52 | 1865588.68 | 1449.00 | 1423.00 |
| | | | building_00013 | x | 0 | | 25.00 | r | 6672782.25 | 1865641.82 | 1452.00 | 1427.00 |
| | | | | | | | | | 6672813.33 | 1865641.65 | 1452.00 | 1426.82 |
| | | | | | | | | | 6672813.20 | 1865621.70 | 1452.00 | 1426.55 |
| | | | | | | | | | 6672832.99 | 1865621.56 | 1452.00 | 1426.46 |
| | | | | | | | | | 6672832.68 | 1865574.76 | 1452.00 | 1425.86 |
| | | | | | | | | | 6672808.71 | 1865574.92 | 1452.00 | 1425.70 |
| | | | | | | | | | 6672808.82 | 1865592.39 | 1452.00 | 1426.12 |
| | | | | | | | | | 6672802.89 | 1865592.44 | 1452.00 | 1426.07 |
| | | | | | | | | | 6672802.78 | 1865573.96 | 1452.00 | 1425.62 |
| | | | | | | | | | 6672781.83 | 1865574.06 | 1452.00 | 1425.43 |
| | | | building_00014 | x | 0 | | 25.00 | r | 6672850.38 | 1865633.41 | 1451.44 | 1426.44 |
| | | | | | | | | | 6672900.56 | 1865634.00 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672901.00 | 1865596.80 | 1451.44 | 1425.31 |
| | | | | | | | | | 6672874.61 | 1865596.49 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672874.82 | 1865580.73 | 1451.44 | 1426.00 |
| | | | | | | | | | 6672851.00 | 1865580.43 | 1451.44 | 1426.00 |
| | | | building_00015 | x | 0 | | 25.00 | r | 6672913.00 | 1865626.25 | 1450.17 | 1425.17 |
| | | | | | | | | | 6672913.18 | 1865577.78 | 1450.17 | 1425.00 |
| | | | | | | | | | 6672934.52 | 1865577.86 | 1450.17 | 1425.21 |
| | | | | | | | | | 6672934.45 | 1865595.03 | 1450.17 | 1425.40 |
| | | | | | | | | | 6672940.21 | 1865595.06 | 1450.17 | 1425.54 |
| | | | | | | | | | 6672940.27 | 1865577.88 | 1450.17 | 1425.28 |
| | | | | | | | | | 6672965.27 | 1865577.97 | 1450.17 | 1425.52 |
| | | | | | | | | | 6672965.09 | 1865626.44 | 1450.17 | 1426.00 |
| | | | building_00016 | x | 0 | | 25.00 | r | 6672975.52 | 1865629.17 | 1450.91 | 1425.91 |
| | | | | | | | | | 6672976.23 | 1865575.72 | 1450.91 | 1425.21 |
| | | | | | | | | | 6673001.54 | 1865576.03 | 1450.91 | 1425.00 |
| | | | | | | | | | 6673001.32 | 1865593.17 | 1450.91 | 1424.96 |
| | | | | | | | | | 6673027.99 | 1865593.52 | 1450.91 | 1423.72 |
| | | | | | | | | | 6673027.06 | 1865664.92 | 1450.91 | 1427.17 |
| | | | | | | | | | 6673004.18 | 1865664.62 | 1450.91 | 1428.32 |
| | | | | | | | | | 6673004.64 | 1865629.54 | 1450.91 | 1424.19 |
| | | | building_00017 | x | 0 | | 25.00 | r | 6673037.98 | 1865641.89 | 1446.25 | 1421.25 |
| | | | | | | | | | 6673075.51 | 1865642.06 | 1446.25 | 1424.40 |
| | | | | | | | | | 6673075.56 | 1865628.74 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673083.88 | 1865628.77 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673083.99 | 1865607.59 | 1446.25 | 1424.00 |
| | | | | | | | | | 6673081.02 | 1865607.58 | 1446.25 | 1423.97 |
| | | | | | | | | | 6673081.19 | 1865571.30 | 1446.25 | 1423.00 |
| | | | | | | | | | 6673056.49 | 1865571.17 | 1446.25 | 1423.00 |
| | | | | | | | | | 6673056.38 | 1865592.28 | 1446.25 | 1423.10 |
| | | | | | | | | | 6673038.19 | 1865592.21 | 1446.25 | 1423.00 |
| | | | building_00018 | x | 0 | | 25.00 | r | 6673098.20 | 1865628.79 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673098.91 | 1865591.31 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673124.37 | 1865591.80 | 1449.00 | 1423.62 |
| | | | | | | | | | 6673124.70 | 1865575.35 | 1449.00 | 1423.33 |
| | | | | | | | | | 6673149.33 | 1865575.81 | 1449.00 | 1423.10 |
| | | | | | | | | | 6673148.29 | 1865629.73 | 1449.00 | 1423.84 |
| | | | building_00019 | x | 0 | | 25.00 | r | 6673160.17 | 1865625.85 | 1448.73 | 1423.73 |
| | | | | | | | | | 6673211.53 | 1865626.91 | 1448.73 | 1423.71 |
| | | | | | | | | | 6673212.55 | 1865578.62 | 1448.73 | 1423.04 |
| | | | | | | | | | 6673191.12 | 1865578.18 | 1448.73 | 1423.01 |
| | | | | | | | | | 6673190.73 | 1865595.94 | 1448.73 | 1423.26 |
| | | | | | | | | | 6673185.28 | 1865595.81 | 1448.73 | 1423.27 |
| | | | | | | | | | 6673185.68 | 1865578.34 | 1448.73 | 1423.02 |
| | | | | | | | | | 6673161.16 | 1865577.81 | 1448.73 | 1423.04 |
| | | | building_00020 | x | 0 | | 25.00 | r | 6673227.66 | 1865635.56 | 1448.83 | 1423.83 |
| | | | | | | | | | 6673274.75 | 1865635.77 | 1448.83 | 1423.81 |
| | | | | | | | | | 6673274.98 | 1865581.76 | 1448.83 | 1423.00 |
| | | | | | | | | | 6673250.68 | 1865581.67 | 1448.83 | 1423.08 |
| | | | | | | | | | 6673250.60 | 1865604.31 | 1448.83 | 1423.35 |
| | | | | | | | | | 6673247.72 | 1865604.30 | 1448.83 | 1423.36 |
| | | | | | | | | | 6673247.74 | 1865598.47 | 1448.83 | 1423.29 |
| | | | | | | | | | 6673227.83 | 1865598.40 | 1448.83 | 1423.33 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00021 | x | 0 | | 25.00 | r | 6673292.07 | 1865642.85 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673292.92 | 1865576.84 | 1449.00 | 1422.60 |
| | | | | | | | | | 6673314.29 | 1865577.10 | 1449.00 | 1422.45 |
| | | | | | | | | | 6673314.11 | 1865591.48 | 1449.00 | 1423.24 |
| | | | | | | | | | 6673319.38 | 1865591.53 | 1449.00 | 1423.25 |
| | | | | | | | | | 6673319.55 | 1865577.70 | 1449.00 | 1422.53 |
| | | | | | | | | | 6673344.73 | 1865578.01 | 1449.00 | 1423.14 |
| | | | | | | | | | 6673343.92 | 1865642.13 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673315.68 | 1865641.78 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673315.68 | 1865643.16 | 1449.00 | 1424.00 |
| | | | building_00022 | x | 0 | | 25.00 | r | 6673355.86 | 1865614.45 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673371.08 | 1865614.65 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673370.52 | 1865645.11 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673400.36 | 1865645.40 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673400.55 | 1865594.27 | 1449.00 | 1423.36 |
| | | | | | | | | | 6673380.54 | 1865594.49 | 1449.00 | 1423.37 |
| | | | | | | | | | 6673380.92 | 1865573.82 | 1449.00 | 1422.69 |
| | | | | | | | | | 6673356.46 | 1865573.58 | 1449.00 | 1422.67 |
| | | | building_00023 | x | 0 | | 25.00 | r | 6673417.27 | 1865649.14 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673470.05 | 1865649.95 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673470.60 | 1865616.40 | 1449.00 | 1423.85 |
| | | | | | | | | | 6673451.44 | 1865616.11 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673451.67 | 1865601.22 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673444.83 | 1865601.13 | 1449.00 | 1423.98 |
| | | | | | | | | | 6673445.22 | 1865578.31 | 1449.00 | 1423.24 |
| | | | | | | | | | 6673418.41 | 1865577.88 | 1449.00 | 1422.94 |
| | | | building_00024 | x | 0 | | 25.00 | r | 6673481.13 | 1865649.77 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673534.82 | 1865650.37 | 1449.00 | 1423.66 |
| | | | | | | | | | 6673535.18 | 1865617.43 | 1449.00 | 1423.62 |
| | | | | | | | | | 6673514.54 | 1865617.21 | 1449.00 | 1424.00 |
| | | | | | | | | | 6673514.76 | 1865600.40 | 1449.00 | 1423.84 |
| | | | | | | | | | 6673508.64 | 1865600.31 | 1449.00 | 1423.72 |
| | | | | | | | | | 6673508.88 | 1865577.96 | 1449.00 | 1422.52 |
| | | | | | | | | | 6673481.91 | 1865577.68 | 1449.00 | 1422.64 |
| | | | building_00025 | x | 0 | | 25.00 | r | 6673544.86 | 1865654.08 | 1448.40 | 1423.40 |
| | | | | | | | | | 6673545.04 | 1865620.96 | 1448.40 | 1423.42 |
| | | | | | | | | | 6673565.23 | 1865621.08 | 1448.40 | 1423.03 |
| | | | | | | | | | 6673565.32 | 1865604.41 | 1448.40 | 1422.95 |
| | | | | | | | | | 6673570.86 | 1865604.43 | 1448.40 | 1422.78 |
| | | | | | | | | | 6673570.97 | 1865580.59 | 1448.40 | 1422.02 |
| | | | | | | | | | 6673597.76 | 1865580.76 | 1448.40 | 1420.67 |
| | | | | | | | | | 6673597.34 | 1865654.38 | 1448.40 | 1424.14 |
| | | | building_00026 | x | 0 | | 25.00 | r | 6673633.28 | 1865675.33 | 1450.57 | 1425.57 |
| | | | | | | | | | 6673682.46 | 1865675.62 | 1450.57 | 1426.00 |
| | | | | | | | | | 6673682.75 | 1865630.10 | 1450.57 | 1425.42 |
| | | | | | | | | | 6673651.00 | 1865629.91 | 1450.57 | 1423.86 |
| | | | | | | | | | 6673651.06 | 1865622.52 | 1450.57 | 1423.39 |
| | | | | | | | | | 6673624.73 | 1865622.35 | 1450.57 | 1423.36 |
| | | | | | | | | | 6673624.59 | 1865644.26 | 1450.57 | 1424.30 |
| | | | | | | | | | 6673627.19 | 1865644.27 | 1450.57 | 1424.28 |
| | | | | | | | | | 6673627.09 | 1865661.92 | 1450.57 | 1425.02 |
| | | | | | | | | | 6673633.36 | 1865661.98 | 1450.57 | 1425.03 |
| | | | building_00027 | x | 0 | | 25.00 | r | 6673670.68 | 1865604.54 | 1447.23 | 1422.23 |
| | | | | | | | | | 6673730.52 | 1865605.34 | 1447.23 | 1421.64 |
| | | | | | | | | | 6673730.97 | 1865573.32 | 1447.23 | 1420.17 |
| | | | | | | | | | 6673692.89 | 1865572.78 | 1447.23 | 1419.96 |
| | | | | | | | | | 6673692.97 | 1865566.59 | 1447.23 | 1419.62 |
| | | | | | | | | | 6673671.18 | 1865566.29 | 1447.23 | 1419.87 |
| | | | building_00028 | x | 0 | | 25.00 | r | 6673738.11 | 1865607.26 | 1446.38 | 1421.38 |
| | | | | | | | | | 6673738.38 | 1865574.51 | 1446.38 | 1420.26 |
| | | | | | | | | | 6673769.76 | 1865574.95 | 1446.38 | 1420.04 |
| | | | | | | | | | 6673769.94 | 1865566.84 | 1446.38 | 1419.59 |
| | | | | | | | | | 6673802.72 | 1865566.96 | 1446.38 | 1420.52 |
| | | | | | | | | | 6673802.64 | 1865590.07 | 1446.38 | 1421.48 |
| | | | | | | | | | 6673787.42 | 1865589.69 | 1446.38 | 1421.11 |
| | | | | | | | | | 6673787.02 | 1865607.92 | 1446.38 | 1421.71 |
| | | | building_00029 | x | 0 | | 25.00 | r | 6673849.38 | 1865611.46 | 1447.61 | 1422.60 |
| | | | | | | | | | 6673907.22 | 1865611.67 | 1447.61 | 1421.39 |
| | | | | | | | | | 6673907.34 | 1865579.50 | 1447.61 | 1420.58 |
| | | | | | | | | | 6673871.20 | 1865579.37 | 1447.61 | 1420.14 |
| | | | | | | | | | 6673871.25 | 1865567.87 | 1447.61 | 1419.38 |
| | | | | | | | | | 6673849.54 | 1865567.79 | 1447.61 | 1419.31 |
| | | | building_00030 | x | 0 | | 25.00 | r | 6673856.43 | 1865671.75 | 1448.50 | 1423.50 |
| | | | | | | | | | 6673857.15 | 1865623.46 | 1448.50 | 1422.79 |
| | | | | | | | | | 6673890.29 | 1865623.95 | 1448.50 | 1422.03 |
| | | | | | | | | | 6673890.05 | 1865640.47 | 1448.50 | 1422.38 |
| | | | | | | | | | 6673885.39 | 1865640.41 | 1448.50 | 1422.45 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6673885.18 | 1865655.55 | 1448.50 | 1422.67 |
| | | | | | | | | | 6673908.27 | 1865655.89 | 1448.50 | 1422.15 |
| | | | | | | | | | 6673907.95 | 1865678.38 | 1448.50 | 1422.08 |
| | | | | | | | | | 6673875.53 | 1865677.90 | 1448.50 | 1422.98 |
| | | | | | | | | | 6673875.61 | 1865672.04 | 1448.50 | 1422.95 |
| | | | building_00031 | x | 0 | | 25.00 | r | 6674034.11 | 1865691.69 | 1446.16 | 1421.16 |
| | | | | | | | | | 6674034.50 | 1865668.70 | 1446.16 | 1420.80 |
| | | | | | | | | | 6674051.45 | 1865668.98 | 1446.16 | 1420.46 |
| | | | | | | | | | 6674051.60 | 1865660.32 | 1446.16 | 1420.22 |
| | | | | | | | | | 6674057.78 | 1865660.41 | 1446.16 | 1420.07 |
| | | | | | | | | | 6674057.89 | 1865653.75 | 1446.16 | 1419.82 |
| | | | | | | | | | 6674053.87 | 1865653.66 | 1446.16 | 1419.98 |
| | | | | | | | | | 6674054.21 | 1865633.61 | 1446.16 | 1419.49 |
| | | | | | | | | | 6674085.81 | 1865634.17 | 1446.16 | 1419.00 |
| | | | | | | | | | 6674085.00 | 1865681.98 | 1446.16 | 1420.43 |
| | | | | | | | | | 6674069.41 | 1865681.71 | 1446.16 | 1420.37 |
| | | | | | | | | | 6674069.30 | 1865687.60 | 1446.16 | 1420.79 |
| | | | | | | | | | 6674053.38 | 1865687.32 | 1446.16 | 1420.96 |
| | | | | | | | | | 6674053.30 | 1865692.02 | 1446.16 | 1421.10 |
| | | | building_00059 | x | 0 | | 25.00 | r | 6672804.48 | 1865472.14 | 1446.53 | 1421.53 |
| | | | | | | | | | 6672857.08 | 1865472.44 | 1446.53 | 1421.72 |
| | | | | | | | | | 6672857.16 | 1865460.76 | 1446.53 | 1421.52 |
| | | | | | | | | | 6672865.69 | 1865460.82 | 1446.53 | 1421.17 |
| | | | | | | | | | 6672865.91 | 1865426.22 | 1446.53 | 1420.22 |
| | | | | | | | | | 6672830.47 | 1865425.98 | 1446.53 | 1419.94 |
| | | | | | | | | | 6672830.38 | 1865440.90 | 1446.53 | 1420.61 |
| | | | | | | | | | 6672804.69 | 1865440.73 | 1446.53 | 1419.79 |
| | | | building_00060 | x | 0 | | 25.00 | r | 6672706.64 | 1865458.39 | 1448.93 | 1423.93 |
| | | | | | | | | | 6672739.30 | 1865458.94 | 1448.93 | 1424.00 |
| | | | | | | | | | 6672740.14 | 1865410.29 | 1448.93 | 1420.00 |
| | | | | | | | | | 6672698.86 | 1865409.56 | 1448.93 | 1421.55 |
| | | | | | | | | | 6672698.36 | 1865438.12 | 1448.93 | 1423.33 |
| | | | | | | | | | 6672701.94 | 1865438.17 | 1448.93 | 1423.29 |
| | | | | | | | | | 6672701.78 | 1865448.51 | 1448.93 | 1423.86 |
| | | | | | | | | | 6672706.83 | 1865448.60 | 1448.93 | 1423.84 |
| | | | building_00063 | x | 0 | | 25.00 | r | 6672525.70 | 1865467.81 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672566.17 | 1865467.81 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672566.19 | 1865446.16 | 1449.00 | 1423.96 |
| | | | | | | | | | 6672584.32 | 1865446.15 | 1449.00 | 1423.64 |
| | | | | | | | | | 6672584.34 | 1865414.78 | 1449.00 | 1423.00 |
| | | | | | | | | | 6672557.98 | 1865414.76 | 1449.00 | 1422.78 |
| | | | | | | | | | 6672557.97 | 1865417.99 | 1449.00 | 1422.89 |
| | | | | | | | | | 6672525.70 | 1865417.99 | 1449.00 | 1424.04 |
| | | | building_00064 | x | 0 | | 25.00 | r | 6672409.94 | 1865464.95 | 1449.00 | 1424.00 |
| | | | | | | | | | 6672410.37 | 1865437.07 | 1449.00 | 1423.64 |
| | | | | | | | | | 6672424.50 | 1865437.31 | 1449.00 | 1423.81 |
| | | | | | | | | | 6672424.86 | 1865415.58 | 1449.00 | 1423.35 |
| | | | | | | | | | 6672457.33 | 1865416.10 | 1449.00 | 1423.83 |
| | | | | | | | | | 6672456.52 | 1865465.66 | 1449.00 | 1424.72 |
| | | | building_00066 | x | 0 | | 25.00 | r | 6672235.14 | 1865464.64 | 1448.94 | 1423.94 |
| | | | | | | | | | 6672267.04 | 1865464.72 | 1448.94 | 1423.84 |
| | | | | | | | | | 6672267.11 | 1865444.99 | 1448.94 | 1423.45 |
| | | | | | | | | | 6672281.55 | 1865445.01 | 1448.94 | 1423.32 |
| | | | | | | | | | 6672281.63 | 1865416.26 | 1448.94 | 1422.51 |
| | | | | | | | | | 6672235.29 | 1865416.13 | 1448.94 | 1423.27 |
| | | | building_00070 | x | 0 | | 25.00 | r | 6672099.34 | 1865452.28 | 1449.57 | 1424.57 |
| | | | | | | | | | 6672099.82 | 1865413.27 | 1449.57 | 1424.00 |
| | | | | | | | | | 6672158.93 | 1865414.00 | 1449.57 | 1424.13 |
| | | | | | | | | | 6672158.46 | 1865452.72 | 1449.57 | 1423.25 |
| | | | | | | | | | 6672144.11 | 1865452.55 | 1449.57 | 1424.00 |
| | | | | | | | | | 6672143.98 | 1865463.47 | 1449.57 | 1424.25 |
| | | | | | | | | | 6672103.97 | 1865463.00 | 1449.57 | 1424.87 |
| | | | | | | | | | 6672104.10 | 1865452.34 | 1449.57 | 1424.61 |
| | | | building_00071 | x | 0 | | 25.00 | r | 6671915.49 | 1865462.42 | 1448.99 | 1423.99 |
| | | | | | | | | | 6671947.51 | 1865462.39 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671947.50 | 1865465.45 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671974.44 | 1865465.44 | 1448.99 | 1423.92 |
| | | | | | | | | | 6671974.41 | 1865439.53 | 1448.99 | 1423.36 |
| | | | | | | | | | 6671954.65 | 1865439.53 | 1448.99 | 1424.00 |
| | | | | | | | | | 6671954.60 | 1865411.54 | 1448.99 | 1423.75 |
| | | | | | | | | | 6671915.43 | 1865411.58 | 1448.99 | 1423.38 |
| | | | building_00074 | x | 0 | | 25.00 | r | 6671805.75 | 1865459.62 | 1450.21 | 1425.21 |
| | | | | | | | | | 6671837.83 | 1865460.10 | 1450.21 | 1426.00 |
| | | | | | | | | | 6671838.56 | 1865410.58 | 1450.21 | 1424.31 |
| | | | | | | | | | 6671792.34 | 1865409.86 | 1450.21 | 1426.00 |
| | | | | | | | | | 6671791.90 | 1865438.65 | 1450.21 | 1425.54 |
| | | | | | | | | | 6671806.07 | 1865438.88 | 1450.21 | 1425.70 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | building_00075 | x | 0 | | 25.00 | r | 6671612.98 | 1865458.24 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671613.19 | 1865434.18 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671627.87 | 1865434.31 | 1451.00 | 1426.00 |
| | | | | | | | | | 6671628.11 | 1865407.96 | 1451.00 | 1425.38 |
| | | | | | | | | | 6671683.26 | 1865408.45 | 1451.00 | 1424.45 |
| | | | | | | | | | 6671683.05 | 1865434.14 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671661.68 | 1865433.96 | 1451.00 | 1425.34 |
| | | | | | | | | | 6671661.58 | 1865445.60 | 1451.00 | 1425.08 |
| | | | | | | | | | 6671666.48 | 1865445.62 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671666.33 | 1865462.43 | 1451.00 | 1425.00 |
| | | | | | | | | | 6671627.62 | 1865462.07 | 1451.00 | 1425.18 |
| | | | | | | | | | 6671627.66 | 1865458.36 | 1451.00 | 1425.56 |
| | | | building_00077 | x | 0 | | 25.00 | r | 6670694.99 | 1865662.33 | 1452.00 | 1427.00 |
| | | | | | | | | | 6670716.11 | 1865662.77 | 1452.00 | 1427.00 |
| | | | | | | | | | 6670716.33 | 1865652.00 | 1452.00 | 1427.09 |
| | | | | | | | | | 6670738.09 | 1865652.44 | 1452.00 | 1427.03 |
| | | | | | | | | | 6670739.02 | 1865605.90 | 1452.00 | 1428.48 |
| | | | | | | | | | 6670696.13 | 1865605.05 | 1452.00 | 1428.87 |
| | | | building_00078 | x | 0 | | 25.00 | r | 6670745.40 | 1865631.72 | 1453.05 | 1428.05 |
| | | | | | | | | | 6670745.94 | 1865590.17 | 1453.05 | 1428.74 |
| | | | | | | | | | 6670788.83 | 1865590.76 | 1453.05 | 1428.73 |
| | | | | | | | | | 6670788.24 | 1865636.06 | 1453.05 | 1427.72 |
| | | | | | | | | | 6670770.87 | 1865635.86 | 1453.05 | 1428.03 |
| | | | | | | | | | 6670770.91 | 1865632.07 | 1453.05 | 1428.10 |
| | | | building_00079 | x | 0 | | 25.00 | r | 6670795.76 | 1865624.08 | 1453.08 | 1428.08 |
| | | | | | | | | | 6670796.42 | 1865576.77 | 1453.08 | 1428.88 |
| | | | | | | | | | 6670838.43 | 1865577.32 | 1453.08 | 1428.09 |
| | | | | | | | | | 6670837.89 | 1865616.08 | 1453.08 | 1428.00 |
| | | | | | | | | | 6670818.04 | 1865615.79 | 1453.08 | 1428.00 |
| | | | | | | | | | 6670817.92 | 1865624.38 | 1453.08 | 1428.00 |
| | | | building_00080 | x | 0 | | 25.00 | r | 6670845.78 | 1865611.45 | 1453.00 | 1428.00 |
| | | | | | | | | | 6670846.23 | 1865570.04 | 1453.00 | 1428.00 |
| | | | | | | | | | 6670888.76 | 1865570.48 | 1453.00 | 1428.48 |
| | | | | | | | | | 6670888.26 | 1865616.41 | 1453.00 | 1428.18 |
| | | | | | | | | | 6670871.16 | 1865616.24 | 1453.00 | 1428.14 |
| | | | | | | | | | 6670871.20 | 1865611.72 | 1453.00 | 1428.24 |
| | | | building_00081 | x | 0 | | 25.00 | r | 6670896.12 | 1865619.38 | 1453.14 | 1428.14 |
| | | | | | | | | | 6670917.82 | 1865619.57 | 1453.14 | 1428.16 |
| | | | | | | | | | 6670917.91 | 1865610.54 | 1453.14 | 1428.45 |
| | | | | | | | | | 6670938.28 | 1865610.73 | 1453.14 | 1428.74 |
| | | | | | | | | | 6670938.60 | 1865573.50 | 1453.14 | 1428.67 |
| | | | | | | | | | 6670896.52 | 1865573.13 | 1453.14 | 1428.66 |
| | | | building_00082 | x | 0 | | 25.00 | r | 6670945.37 | 1865608.68 | 1453.82 | 1428.82 |
| | | | | | | | | | 6670945.99 | 1865561.41 | 1453.82 | 1428.15 |
| | | | | | | | | | 6670989.21 | 1865561.96 | 1453.82 | 1426.59 |
| | | | | | | | | | 6670988.46 | 1865619.68 | 1453.82 | 1428.64 |
| | | | | | | | | | 6670967.37 | 1865619.42 | 1453.82 | 1428.00 |
| | | | | | | | | | 6670967.49 | 1865608.94 | 1453.82 | 1428.13 |
| | | | building_00083 | x | 0 | | 25.00 | r | 6670995.77 | 1865608.68 | 1453.71 | 1428.71 |
| | | | | | | | | | 6670996.27 | 1865561.92 | 1453.71 | 1426.72 |
| | | | | | | | | | 6671039.37 | 1865562.40 | 1453.71 | 1428.43 |
| | | | | | | | | | 6671038.79 | 1865613.13 | 1453.71 | 1428.92 |
| | | | | | | | | | 6671030.89 | 1865613.02 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671029.73 | 1865615.35 | 1453.71 | 1428.94 |
| | | | | | | | | | 6671027.45 | 1865617.45 | 1453.71 | 1428.86 |
| | | | | | | | | | 6671024.21 | 1865618.35 | 1453.71 | 1428.86 |
| | | | | | | | | | 6671021.10 | 1865617.54 | 1453.71 | 1428.94 |
| | | | | | | | | | 6671018.90 | 1865615.31 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671017.88 | 1865611.85 | 1453.71 | 1429.00 |
| | | | | | | | | | 6671018.98 | 1865608.98 | 1453.71 | 1429.00 |
| | | | building_00084 | x | 0 | | 25.00 | r | 6671045.57 | 1865621.56 | 1453.63 | 1428.63 |
| | | | | | | | | | 6671045.73 | 1865560.16 | 1453.63 | 1428.66 |
| | | | | | | | | | 6671069.61 | 1865560.21 | 1453.63 | 1429.90 |
| | | | | | | | | | 6671069.60 | 1865572.77 | 1453.63 | 1429.91 |
| | | | | | | | | | 6671088.57 | 1865572.80 | 1453.63 | 1430.00 |
| | | | | | | | | | 6671088.49 | 1865612.32 | 1453.63 | 1429.74 |
| | | | | | | | | | 6671068.27 | 1865612.25 | 1453.63 | 1429.00 |
| | | | | | | | | | 6671068.24 | 1865621.64 | 1453.63 | 1429.00 |
| | | | building_00085 | x | 0 | | 25.00 | r | 6671095.37 | 1865609.65 | 1454.92 | 1429.92 |
| | | | | | | | | | 6671095.63 | 1865563.33 | 1454.92 | 1430.00 |
| | | | | | | | | | 6671138.55 | 1865563.55 | 1454.92 | 1430.00 |
| | | | | | | | | | 6671138.25 | 1865620.40 | 1454.92 | 1429.05 |
| | | | | | | | | | 6671117.76 | 1865620.29 | 1454.92 | 1429.00 |
| | | | | | | | | | 6671117.80 | 1865609.77 | 1454.92 | 1429.27 |
| | | | building_00086 | x | 0 | | 25.00 | r | 6671145.90 | 1865615.04 | 1454.27 | 1429.27 |
| | | | | | | | | | 6671146.02 | 1865573.26 | 1454.27 | 1430.00 |
| | | | | | | | | | 6671188.79 | 1865573.34 | 1454.27 | 1430.00 |

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | | | | 6671188.71 | 1865612.72 | 1454.27 | 1429.43 |
| | | | | | | | | | 6671167.82 | 1865612.68 | 1454.27 | 1429.39 |
| | | | | | | | | | 6671166.56 | 1865618.94 | 1454.27 | 1429.26 |
| | | | | | | | | | 6671161.19 | 1865621.28 | 1454.27 | 1429.23 |
| | | | | | | | | | 6671155.57 | 1865619.04 | 1454.27 | 1429.24 |
| | | | | | | | | | 6671154.31 | 1865615.07 | 1454.27 | 1429.33 |
| | | | building_00087 | x | 0 | | 25.00 | r | 6671195.80 | 1865610.60 | 1454.52 | 1429.52 |
| | | | | | | | | | 6671196.15 | 1865564.20 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671239.34 | 1865564.50 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671238.92 | 1865621.42 | 1454.52 | 1430.00 |
| | | | | | | | | | 6671218.16 | 1865621.27 | 1454.52 | 1429.86 |
| | | | | | | | | | 6671218.22 | 1865610.75 | 1454.52 | 1429.94 |
| | | | building_00088 | x | 0 | | 25.00 | r | 6671245.44 | 1865619.00 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671245.87 | 1865573.22 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671289.18 | 1865573.60 | 1455.00 | 1430.85 |
| | | | | | | | | | 6671288.79 | 1865614.97 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671264.34 | 1865614.74 | 1455.00 | 1430.06 |
| | | | | | | | | | 6671264.29 | 1865619.18 | 1455.00 | 1430.00 |
| | | | building_00089 | x | 0 | | 25.00 | r | 6671295.58 | 1865614.01 | 1455.00 | 1430.00 |
| | | | | | | | | | 6671295.72 | 1865574.49 | 1455.00 | 1430.86 |
| | | | | | | | | | 6671338.58 | 1865574.65 | 1455.00 | 1431.00 |
| | | | | | | | | | 6671338.42 | 1865617.12 | 1455.00 | 1430.34 |
| | | | | | | | | | 6671329.98 | 1865617.09 | 1455.00 | 1430.29 |
| | | | | | | | | | 6671327.21 | 1865621.26 | 1455.00 | 1430.20 |
| | | | | | | | | | 6671323.06 | 1865622.45 | 1455.00 | 1430.18 |
| | | | | | | | | | 6671318.74 | 1865621.12 | 1455.00 | 1430.14 |
| | | | | | | | | | 6671316.48 | 1865617.95 | 1455.00 | 1430.17 |
| | | | | | | | | | 6671316.37 | 1865614.09 | 1455.00 | 1430.25 |
| | | | building_00090 | x | 0 | | 25.00 | r | 6671345.76 | 1865622.02 | 1455.31 | 1430.31 |
| | | | | | | | | | 6671366.46 | 1865622.20 | 1455.31 | 1430.51 |
| | | | | | | | | | 6671366.53 | 1865611.94 | 1455.31 | 1430.95 |
| | | | | | | | | | 6671388.69 | 1865612.13 | 1455.31 | 1431.10 |
| | | | | | | | | | 6671389.06 | 1865565.99 | 1455.31 | 1431.67 |
| | | | | | | | | | 6671346.21 | 1865565.61 | 1455.31 | 1430.89 |
| | | | building_00091 | x | 0 | | 25.00 | r | 6671396.28 | 1865613.29 | 1456.11 | 1431.11 |
| | | | | | | | | | 6671396.04 | 1865571.72 | 1456.11 | 1431.83 |
| | | | | | | | | | 6671438.53 | 1865571.44 | 1456.11 | 1431.00 |
| | | | | | | | | | 6671438.82 | 1865617.70 | 1456.11 | 1430.23 |
| | | | | | | | | | 6671420.66 | 1865617.78 | 1456.11 | 1431.00 |
| | | | | | | | | | 6671420.62 | 1865613.15 | 1456.11 | 1431.00 |
| | | | building_00092 | x | 0 | | 25.00 | r | 6671513.11 | 1865587.80 | 1456.81 | 1431.81 |
| | | | | | | | | | 6671560.00 | 1865588.22 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671560.39 | 1865545.53 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671522.14 | 1865545.18 | 1456.81 | 1431.79 |
| | | | | | | | | | 6671521.94 | 1865565.48 | 1456.81 | 1432.00 |
| | | | | | | | | | 6671513.35 | 1865565.38 | 1456.81 | 1432.00 |
| | | | building_00093 | x | 0 | | 25.00 | r | 6671514.44 | 1865638.35 | 1457.00 | 1432.00 |
| | | | | | | | | | 6671557.76 | 1865638.61 | 1457.00 | 1432.04 |
| | | | | | | | | | 6671558.03 | 1865595.27 | 1457.00 | 1432.00 |
| | | | | | | | | | 6671500.62 | 1865594.88 | 1457.00 | 1431.50 |
| | | | | | | | | | 6671500.48 | 1865616.61 | 1457.00 | 1431.66 |
| | | | | | | | | | 6671514.58 | 1865616.70 | 1457.00 | 1432.00 |
| | | | building_00094 | x | 0 | | 25.00 | r | 6671505.34 | 1865687.45 | 1457.36 | 1432.35 |
| | | | | | | | | | 6671555.82 | 1865688.03 | 1457.36 | 1433.42 |
| | | | | | | | | | 6671556.34 | 1865645.34 | 1457.36 | 1432.19 |
| | | | | | | | | | 6671513.54 | 1865644.82 | 1457.36 | 1432.00 |
| | | | | | | | | | 6671513.28 | 1865667.68 | 1457.36 | 1432.41 |
| | | | | | | | | | 6671505.62 | 1865667.58 | 1457.36 | 1432.28 |
| | | | | | | | | | 6671502.04 | 1865669.46 | 1457.36 | 1432.23 |
| | | | | | | | | | 6671500.55 | 1865673.34 | 1457.36 | 1432.22 |
| | | | | | | | | | 6671502.01 | 1865678.15 | 1457.36 | 1432.26 |
| | | | | | | | | | 6671505.52 | 1865679.95 | 1457.36 | 1432.33 |
| | | | building_00095 | x | 0 | | 25.00 | r | 6671506.52 | 1865737.67 | 1457.47 | 1432.47 |
| | | | | | | | | | 6671545.26 | 1865738.21 | 1457.47 | 1433.26 |
| | | | | | | | | | 6671545.87 | 1865695.93 | 1457.47 | 1433.00 |
| | | | | | | | | | 6671498.92 | 1865695.25 | 1457.47 | 1432.28 |
| | | | | | | | | | 6671498.60 | 1865717.70 | 1457.47 | 1432.34 |
| | | | | | | | | | 6671506.80 | 1865717.80 | 1457.47 | 1432.50 |

# APPENDIX G-1

# TRAFFIC ANALYSIS

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URBAN | CROSSROADS

# VILLA SERENA SPECIFIC PLAN (TRACT NO. 20245)

## TRAFFIC ANALYSIS

PREPARED BY: Charlene So | cso@urbanxroads.com
Aric Evatt | aevatt@urbanxroads.com




| Reference Number | Agency | Date |
|---|---|---|
| 14896-04 TA Report | City of Upland | April 23, 2024 |

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ADT | Average Daily Traffic |
| CAMUTCD | California Manual on Uniform Traffic Control Devices |
| Caltrans | California Department of Transportation |
| CMP | Congestion Management Program |
| DIF | Development Impact Fee |
| DU | Dwelling Units |
| HCM | Highway Capacity Manual |
| ITE | Institute of Transportation Engineers |
| LOS | Level of Service |
| N/A | Not Applicable |
| NP | No Project or Without Project |
| PHF | Peak Hour Factor |
| Project | Villa Serena Specific Plan |
| RTP | Regional Transportation Plan |
| RV | Recreational Vehicle |
| SBCTA | San Bernardino County Transportation Authority |
| SCAG | Southern California Association of Governments |
| SCS | Sustainable Communities Strategy |
| TA | Traffic Analysis |
| v/c | Volume to Capacity |
| vphgpl | Vehicles per Hour Green per Lane |
| WP | With Project |

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# 1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for Villa Serena Specific Plan development ("Project"), which is located on the northeast corner of Fernando Avenue and 15th Street in the City of Upland, as shown on Exhibit 1-1. The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with the City's General Plan level of service goals and policies. This TA has been prepared in accordance with the City's Traffic Impact Analysis Guidelines (dated July 2020) (**City Guidelines**). (1) The Project traffic study scoping agreement is provided in Appendix 1.1 of this TA, which has been reviewed and approved by the City of Upland.

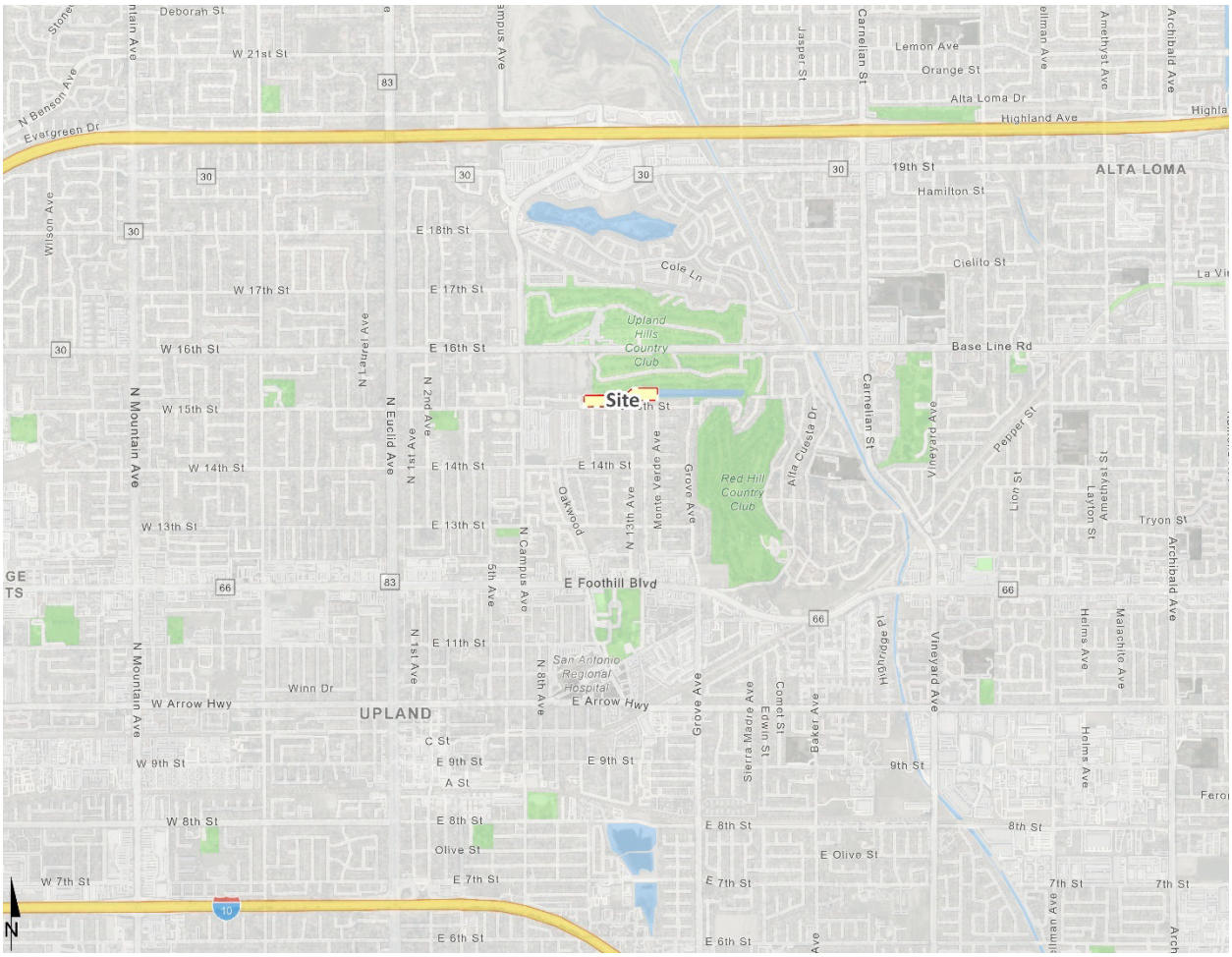
## 1.1 SUMMARY OF FINDINGS

The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to construct Coyote Run Drive West (private driveway) to curve and connect with a new westerly alignment of 15th Street. Project to construct the new westerly alignment of 15th Street between Coyote Run Drive West and the existing westerly terminus (which occurs just east of Campus Avenue). Project to construct 15th Street with 26-feet of pavement to accommodate two-way traffic consistent with the City's standards. Improvements will include curb and gutter improvements to both sides and a sidewalk along the south side which will join with the existing sidewalk adjacent to the existing recreational vehicle (RV) storage.
- Project to construct the ultimate half-section of 15th Street as a local (66-foot right-of-way) along the Project's frontage between Fernando Avenue and the Project's eastern boundary consistent with the City's standards. Frontage improvements include pavement, curb-and-gutter, sidewalk, and landscaping improvements. The proposed sidewalk on the north side of 15th Street will join the proposed sidewalk within the Project to the existing sidewalk on Fernando Avenue. Project will also construct a knuckle on 15th Street at Fernando Avenue.
- A secondary Project access is proposed to 15th Street east of 13th Avenue (Coyote Run Drive East). This driveway will accommodate egress only via a gated entry.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report. The Project is not anticipated to require the construction any off-site improvements. As such, the Project Applicant's responsibility for the Project's contributions towards future off-site improvements is fulfilled through payment into pre-existing fee programs (if applicable). The Project Applicant would be required to pay requisite fees consistent with the City's requirements (see Section 6 *Local and Regional Funding Mechanisms*).

## EXHIBIT 1-1: LOCATION MAP



## 1.2 PROJECT OVERVIEW

A preliminary site plan for the proposed Project is shown on Exhibit 1-2. The Project is proposed to consist of the development of 65 single family detached residential dwelling units. The proposed Project is anticipated to have an opening year of 2025. As indicated on Exhibit 1-2, vehicular access will be provided to 15th Street to the west along a new westerly alignment of 15th Street (via Coyote Run Drive West) and a secondary egress only access to the existing 15th Street (at Coyote Run Drive East). The extension of 15th Street will be separated from the existing 15th Street alignment via a proposed knuckle at Fernando Avenue where the existing 15th Street would terminate. Coyote Run Drive is a private internal roadway proposed within the Project. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021) have been used. (2) The Project is anticipated to generate a total of 614 two-way trips per day with 46 AM peak hour trips and 61 PM peak hour trips (actual vehicles). The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

## 1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2022) Conditions
- Opening Year Cumulative (2025) Without Project
- Opening Year Cumulative (2025) With Project

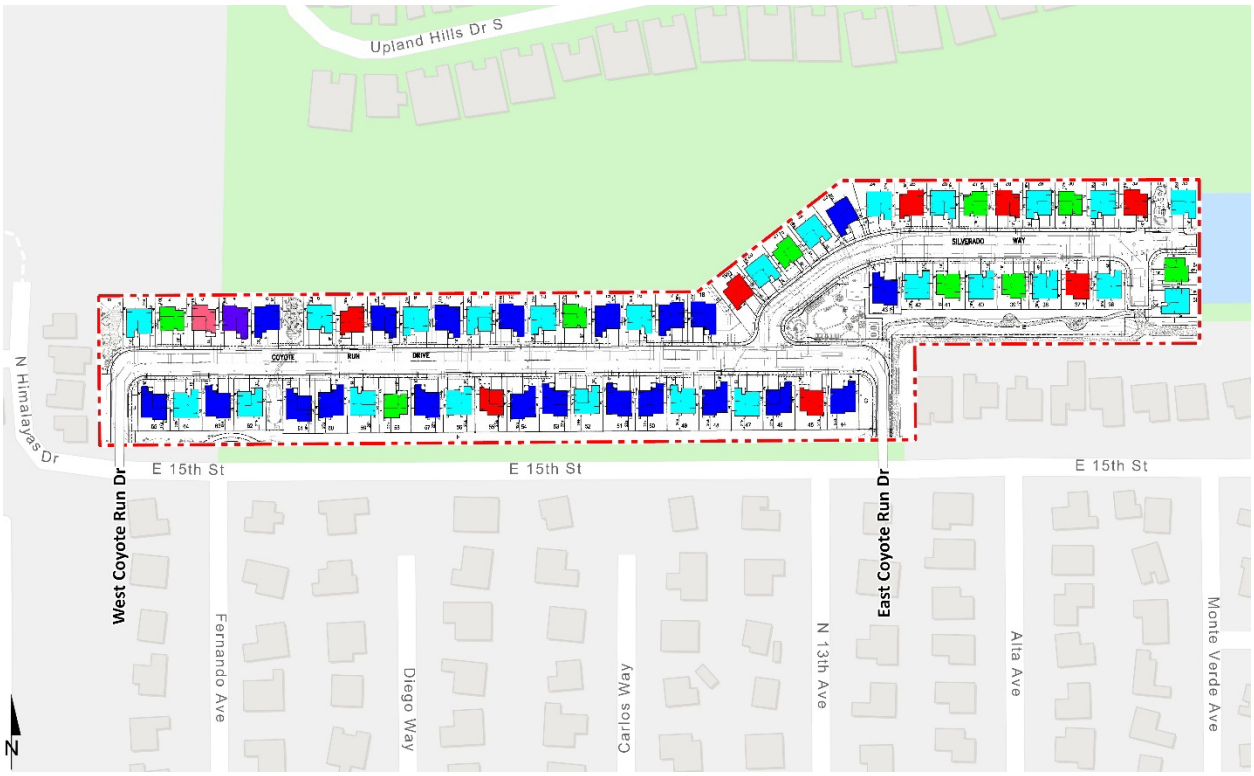
### 1.3.1 EXISTING (2022) CONDITIONS

Information for Existing (2022) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. For a detailed discussion on the existing traffic counts, see Section 3.5 *Existing Traffic Counts*.

### 1.3.2 OPENING YEAR CUMULATIVE (2025) CONDITIONS

The Opening Year Cumulative (2025) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. To account for background traffic growth, an ambient growth factor from Existing (2022) conditions of 6.12% (2 percent per year, compounded over 3 years) is included for Opening Year Cumulative (2025) traffic conditions. Conservatively, this TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed ambient growth rates; and some of these related projects may not be implemented and operational within the 2025 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2025 conditions.

## EXHIBIT 1-2: PRELIMINARY SITE PLAN



## 1.4 STUDY AREA

To ensure that this TA satisfies the City of Upland's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Upland staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City is included in Appendix 1.1 of this TA.

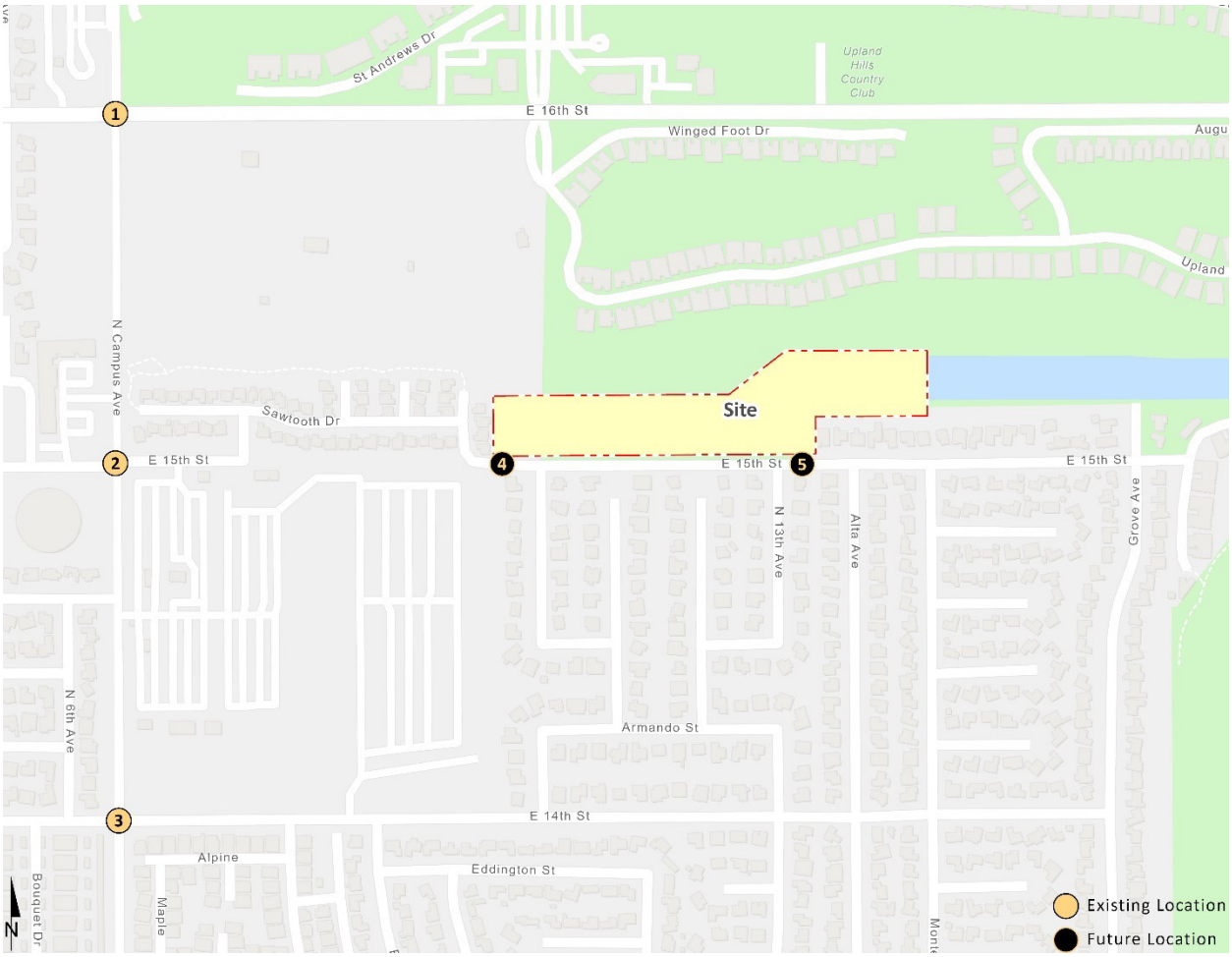
The 5 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Upland staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City's Guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and used throughout the City for the purposes of estimating a potential area of influence (i.e., study area). Some study area intersections have been added at the request of City staff through the scoping process, although the Project is anticipated to contribute less than 50 peak hour trips.

**TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS**

| # | Intersection | Jurisdiction | CMP Intersection? |
|---|---|---|---|
| 1 | Campus Av. & 16th St. | Upland | No |
| 2 | Campus Av. & 15th St. | Upland | No |
| 3 | Campus Av. & 14th St. | Upland | No |
| 4 | Coyote Run Dr. West & 15th St. | Upland | No |
| 5 | Coyote Run Dr. East & 15th St. | Upland | No |

The intent of a Congestion Management Program (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The County of San Bernardino CMP became effective with the passage of Proposition 111 in 1990 and updated most recently in 2016. The San Bernardino County Transportation Authority (SBCTA) adopted the 2016 CMP for the County of San Bernardino in June 2016. (3) There are no study area intersections identified as a San Bernardino County CMP intersection.

## EXHIBIT 1-3: STUDY AREA



## 1.5 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Opening Year Cumulative (2025) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Table 1-2.

**TABLE 1-2: SUMMARY OF LOS**

| | | Existing | | 2025 NP | | 2025 WP | |
|---|---|---|---|---|---|---|---|
| # | Intersection | AM | PM | AM | PM | AM | PM |
| 1 | Campus Av. & 16th St. | ● | ● | ● | ● | ● | ● |
| 2 | Campus Av. & 15th St. | ● | ● | ● | ● | ● | ● |
| 3 | Campus Av. & 14th St. | ● | ● | ● | ● | ● | ● |
| 4 | Coyote Run Dr. West & 15th St. | N/A | N/A | N/A | N/A | ● | ● |
| 5 | Coyote Run Dr. East & 15th St. | N/A | N/A | N/A | N/A | ● | ● |

● = A - D ● = E ● = F

### 1.5.1 EXISTING (2022) CONDITIONS

The study area intersections are currently operating at an acceptable LOS during the peak hours.

### 1.5.2 OPENING YEAR CUMULATIVE (2025) CONDITIONS

All study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours under Opening Year Cumulative (2025) Without and With Project traffic conditions. As such, no improvements are necessary.

## 1.6 RECOMMENDATIONS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project. The site adjacent recommendations are shown on Exhibit 1-4. Exhibit 1-5 illustrates the concept striping plan for the site adjacent roadways of Rider Street and Patterson Avenue.

- Project to construct the ultimate half-section of 15th Street as a local (66-foot right-of-way) along the Project's frontage between Fernando Avenue and the Project's eastern boundary consistent with the City's standards. Frontage improvements include pavement, curb-and-gutter, sidewalk, and landscaping improvements. The proposed sidewalk on the north side of 15th Street will join the proposed sidewalk within the Project to the existing sidewalk on Fernando Avenue.

***Recommendation 1 – Coyote Run Drive West & 15th Street (#4)*** – Project to construct Coyote Run Drive West (private driveway) to curve and connect with a new westerly alignment of 15th Street.

***Recommendation 2 – Fernando Avenue & 15th Street*** – Project will construct a knuckle on 15th Street at Fernando Avenue consistent with City standards.

***Recommendation 3 – Coyote Run Drive East & 15th Street (#5)*** – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach (egress Project traffic) to implement a cross-street stop-controlled intersection. Driveway be restricted to egress only. This driveway will serve as a secondary access point and will be gated.

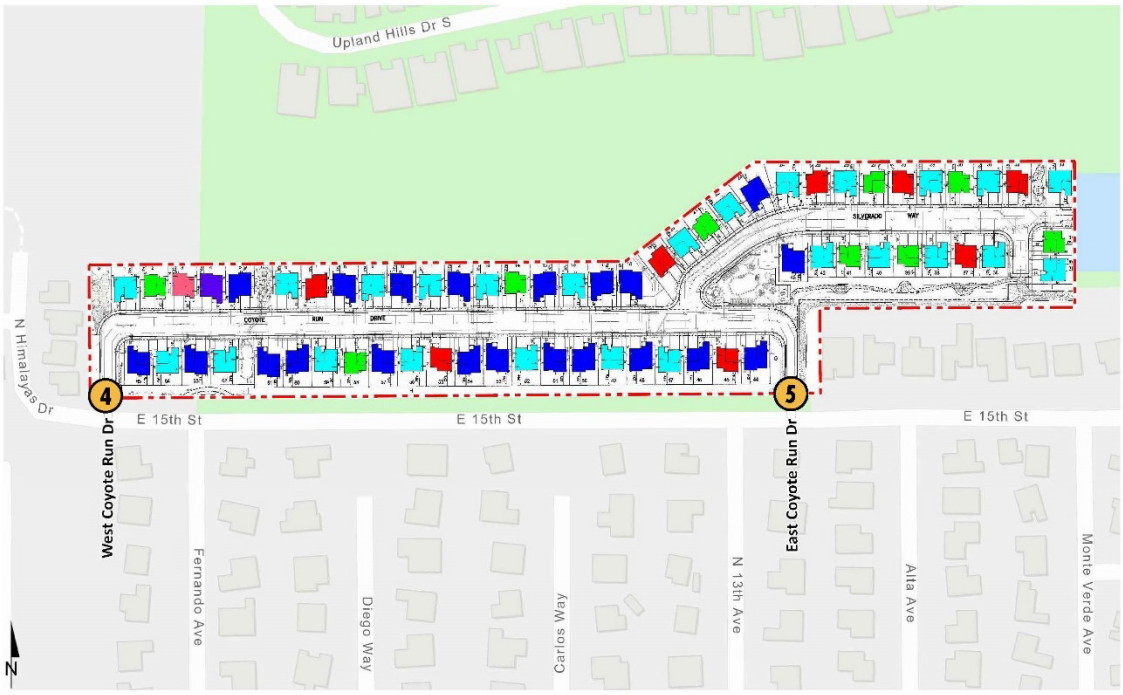
***Recommendation 4 – Western Alignment of 15th Street*** – Project to construct the new westerly alignment of 15th Street between Coyote Run Drive West and the existing westerly terminus (which occurs just east of Campus Avenue). Project to construct 15th Street with 26-feet of pavement to accommodate two-way traffic consistent with the City's standards. Improvements will include curb and gutter improvements to both sides and a sidewalk along the south side which will join with the existing sidewalk adjacent to the existing RV storage. Three speed tables are proposed along 15th Street as a traffic calming measure. A concept striping plan is provided on Exhibit 1-5.

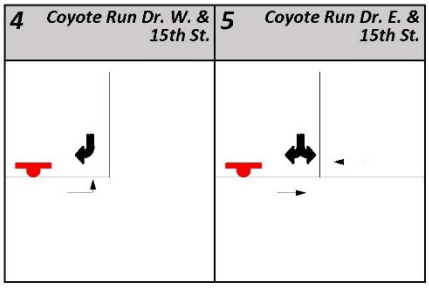
***Recommendation 5 – 15th Street*** – Project to construct the ultimate half-section of 15th Street as a local (66-foot right-of-way) along the Project's frontage between Fernando Avenue and the Project's eastern boundary consistent with the City's standards. Frontage improvements include pavement, curb-and-gutter, sidewalk, and landscaping improvements. The proposed sidewalk on the north side of 15th Street will join the proposed sidewalk within the Project to the existing sidewalk on Fernando Avenue.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Upland sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

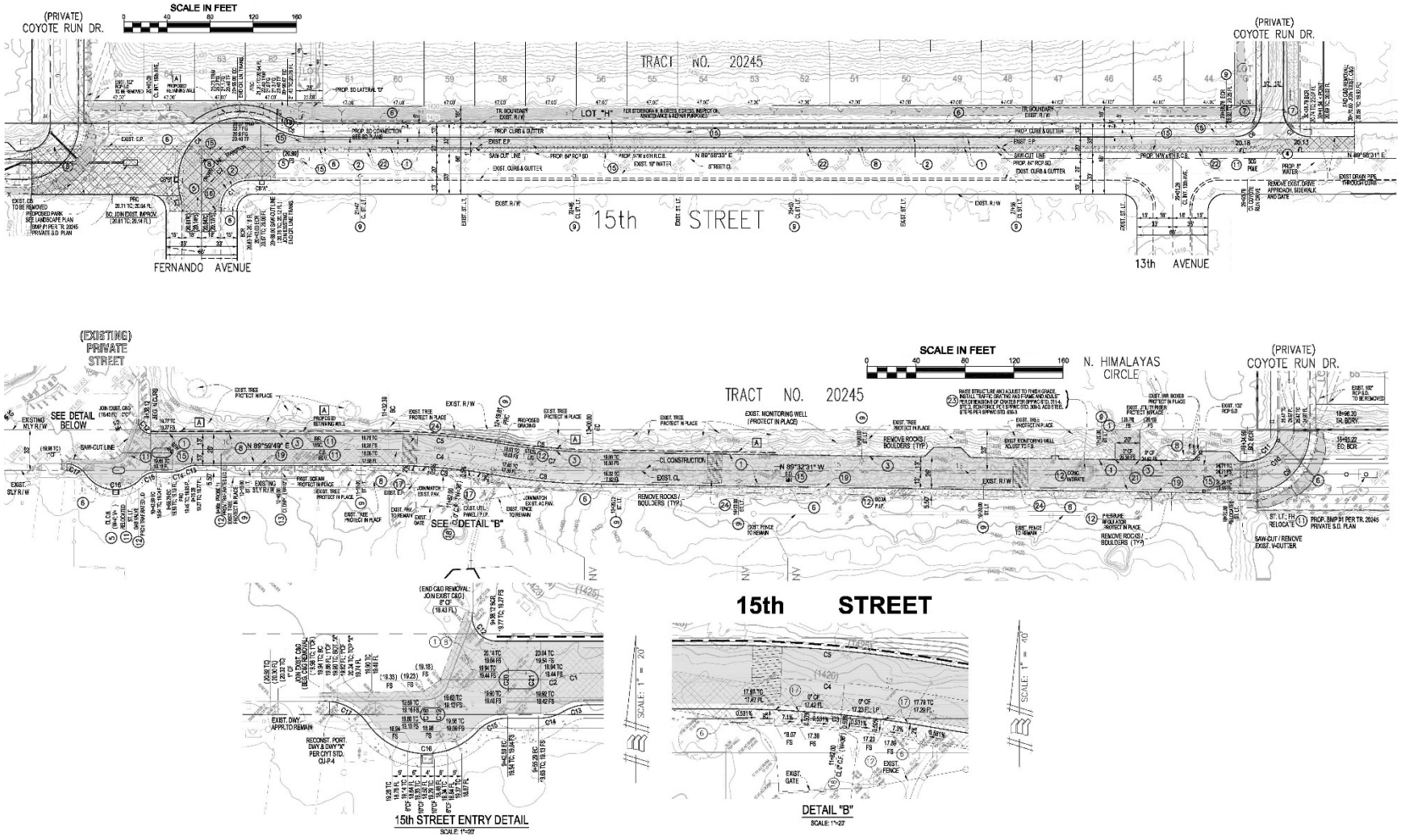
## EXHIBIT 1-4: SITE ACCESS RECOMMENDATIONS




= Stop Sign Improvement
= Existing Lane
= Lane Improvement

## EXHIBIT 1-5: CONCEPT STRIPING PLAN



## 1.7 QUEUING ANALYSIS

The traffic modeling and signal timing optimization software package SimTraffic has been utilized to assess the queues. SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. These random simulations generated by SimTraffic have been utilized to determine the 95$^{th}$ percentile queue lengths observed for each applicable turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals. The results of the queuing analysis are provided in Appendix 1.2 of this report for Opening Year Cumulative (2025) traffic conditions. No site adjacent queues are anticipated with the proposed improvements.

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# 2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Upland's Traffic Study Guidelines.

## 2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

## 2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

### 2.2.1 SIGNALIZED INTERSECTIONS

The City of Upland requires signalized intersection operations analysis based on the methodology described in the HCM. (4) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-1.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

**TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0[1] |
|---|---|---|
| Operations with very low delay occurring with favorable progression and/or short cycle length. | 0 to 10.00 | A |
| Operations with low delay occurring with good progression and/or short cycle lengths. | 10.01 to 20.00 | B |
| Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.01 to 35.00 | C |
| Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.01 to 55.00 | D |
| Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.01 to 80.00 | E |
| Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths. | 80.01 and up | F |

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

A saturation flow rate of 1700 has been utilized for single left turn lanes and 1800 for through and right turn lanes at all study area intersections consistent with the City's Guidelines. The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

### 2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Upland requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

**TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS**

| Description | Average Control Delay (Seconds), V/C ≤ 1.0 | Level of Service, V/C ≤ 1.0[1] |
|---|---|---|
| Little or no delays. | 0 to 10.00 | A |
| Short traffic delays. | 10.01 to 15.00 | B |
| Average traffic delays. | 15.01 to 25.00 | C |
| Long traffic delays. | 25.01 to 35.00 | D |
| Very long traffic delays. | 35.01 to 50.00 | E |
| Extreme traffic delays with intersection capacity exceeded. | > 50.00 | F |

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

## 2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (5)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Rural warrants have been used as posted speed limits on the major roadways with unsignalized intersections are over 40 miles per hour while urban warrants have been used where speeds are 40 miles per hour or below.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants. Traffic signal warrant analyses were performed at Coyote Run East at 15th Street only as there are no other applicable unsignalized study area intersections.

The traffic signal warrant analyses for future conditions are presented in Section 5 *Opening Year Cumulative (2025) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

## 2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions. Consistent with the City's Guidelines, the following criteria will be applied for the traffic analysis: Strive to maintain LOS D at all intersections outside of the Downtown Specific Plan area and the Transit Priority Roadways except where such improvements are physically infeasible or would negatively affect bicyclists, pedestrians, or transit users (Policy CIR-1.1 of the General Plan).

- Any study intersection operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to a LOS E or F shall identify improvements to improve operations to LOS D or better.
- Any study intersection that is operating at LOS E or F without project traffic shall improve the intersection operations to LOS D or better.

## 2.5 DEFICIENCY CRITERIA

To determine whether the addition of Project traffic at a study intersection result in a deficiency, the following thresholds will be utilized:

- Any study intersection that is operating at a LOS A, B, C, or D for any study scenario without Project traffic in which the addition of Project traffic causes the intersection to degrade to LOS E or LOS F shall improve that deficiency so as to bring the intersection back to at least LOS D.
- Any study intersection that is operating at LOS E or LOS F for any study scenario without Project traffic shall improve any deficiency so as to bring the intersection back to at least LOS D.

# 3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Upland General Plan Circulation Network, and a review of existing peak hour intersection operations analysis.

## 3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Upland staff (Appendix 1.1), the study area includes a total of 5 existing and future intersections as shown previously on Exhibit 1-3, where the Project is anticipated to contribute 50 or more peak hour trips or were added at the City's request during the scoping process. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

## 3.2 CITY OF UPLAND GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Upland. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on City of Upland General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Upland General Plan Circulation Element and Exhibit 3-3 illustrates the City of Upland General Plan roadway cross-sections.

The following study area roadways within the City of Upland is classified as a Secondary Arterial:

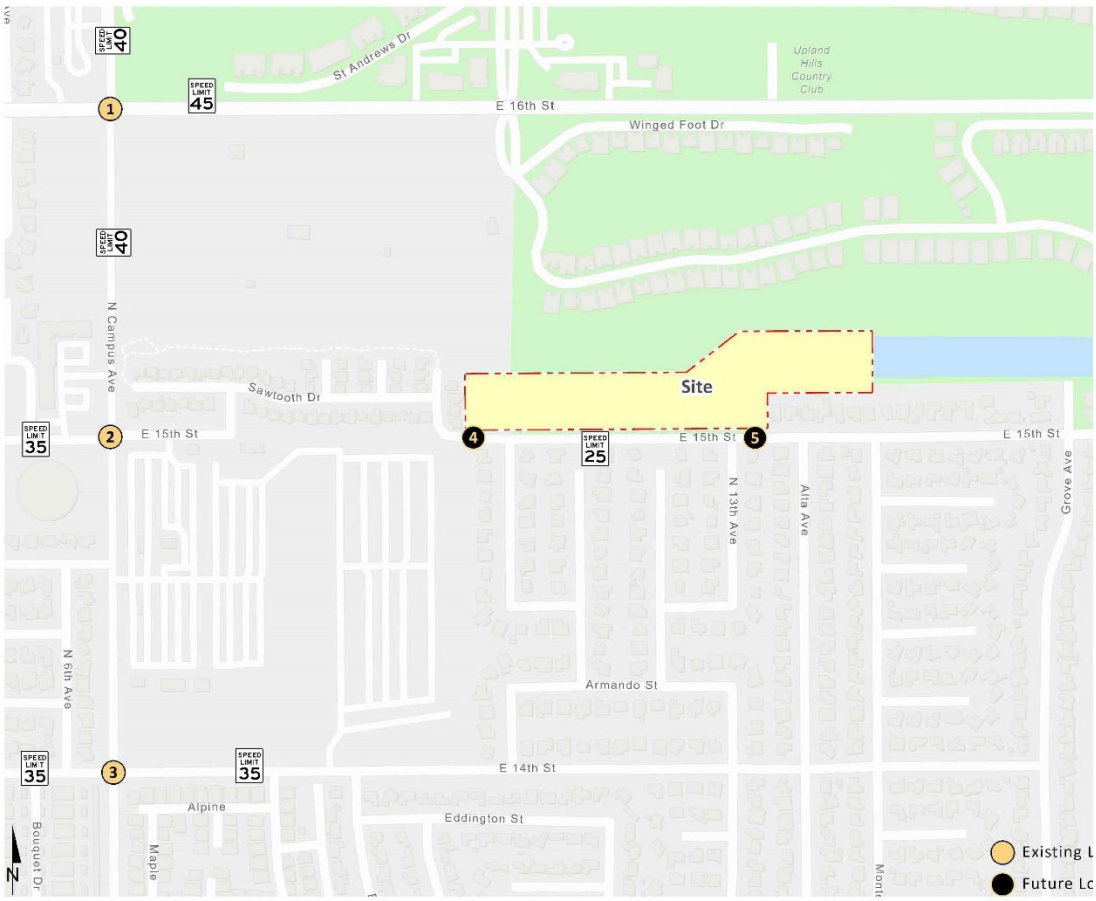
- Campus Avenue
- 16th Street

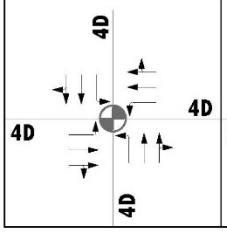
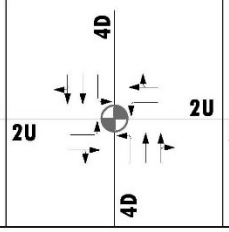
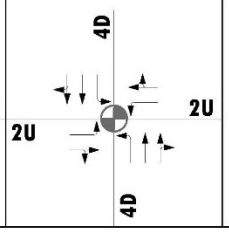
## 3.3 BICYCLE & PEDESTRIAN FACILITIES

The City of Upland bike network is shown on Exhibit 3-4. 16th Street within the study area is a Class II (on-street, striped) bike facility which currently exists. Campus Avenue is identified as an existing Class III (shared on-street, signed but not striped) that is proposed to be upgraded to a Class II bike facility as priority bike lanes.

Campus Avenue is identified as a pedestrian needs priority area between 15th Street and 16th Street. Exhibit 3-5 illustrates the existing crosswalks and sidewalks throughout the study area. Development of the proposed Project would connect the Project to existing pedestrian facilities from those constructed by the Project along its frontage 15th Street. The sidewalk improvements along 15th Street will either connect with the existing sidewalk in front of the existing RV storage and also along the Project frontage to the existing sidewalk along the western side of Fernando Avenue.

## EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

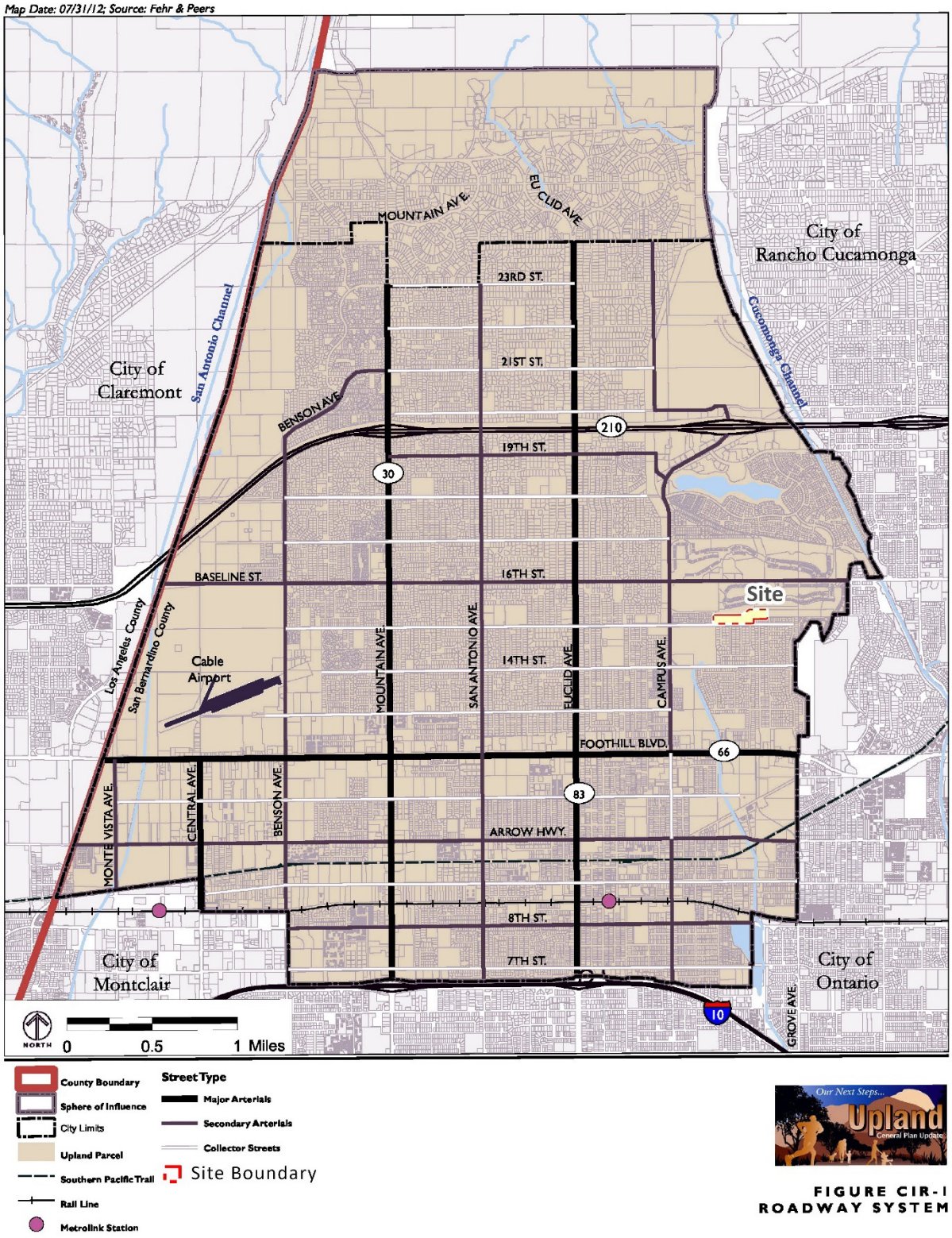



| 1 Campus Av. & 16th St. | 2 Campus Av. & 15th St. | 3 Campus Av. & 14th St. | 4 Coyote Run Dr. W. & 15th St. | 5 Coyote Run Dr. E. & 15th St. |
|---|---|---|---|---|
|  |  |  | Future Intersection | Future Intersection |

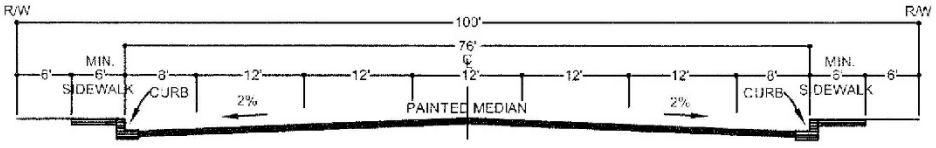


= *Traffic Signal*
**4** = *Number of Lanes*
**D** = *Divided*
**U** = *Undivided*
= *Speed Limit (MPH)*

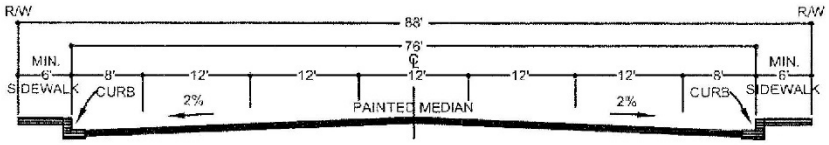
## EXHIBIT 3-2: CITY OF UPLAND GENERAL PLAN CIRCULATION ELEMENT



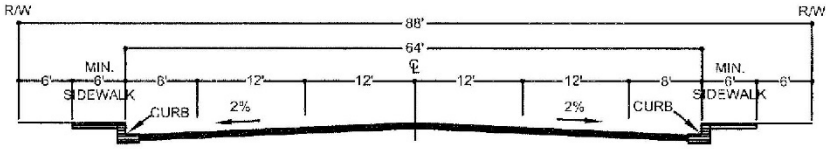

## EXHIBIT 3-3: CITY OF UPLAND GENERAL PLAN ROADWAY CROSS-SECTIONS



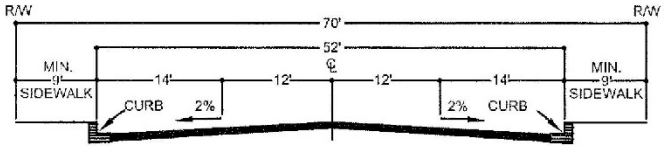

MAJOR (A)



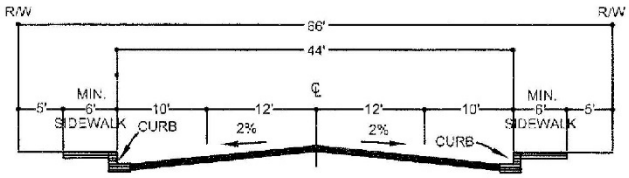

MAJOR (B)




SECONDARY (A)




SECONDARY (B)




COLLECTOR

**SOURCE: CITY OF UPLAND**

## EXHIBIT 3-4: CITY OF UPLAND GENERAL PLAN BIKE NETWORK

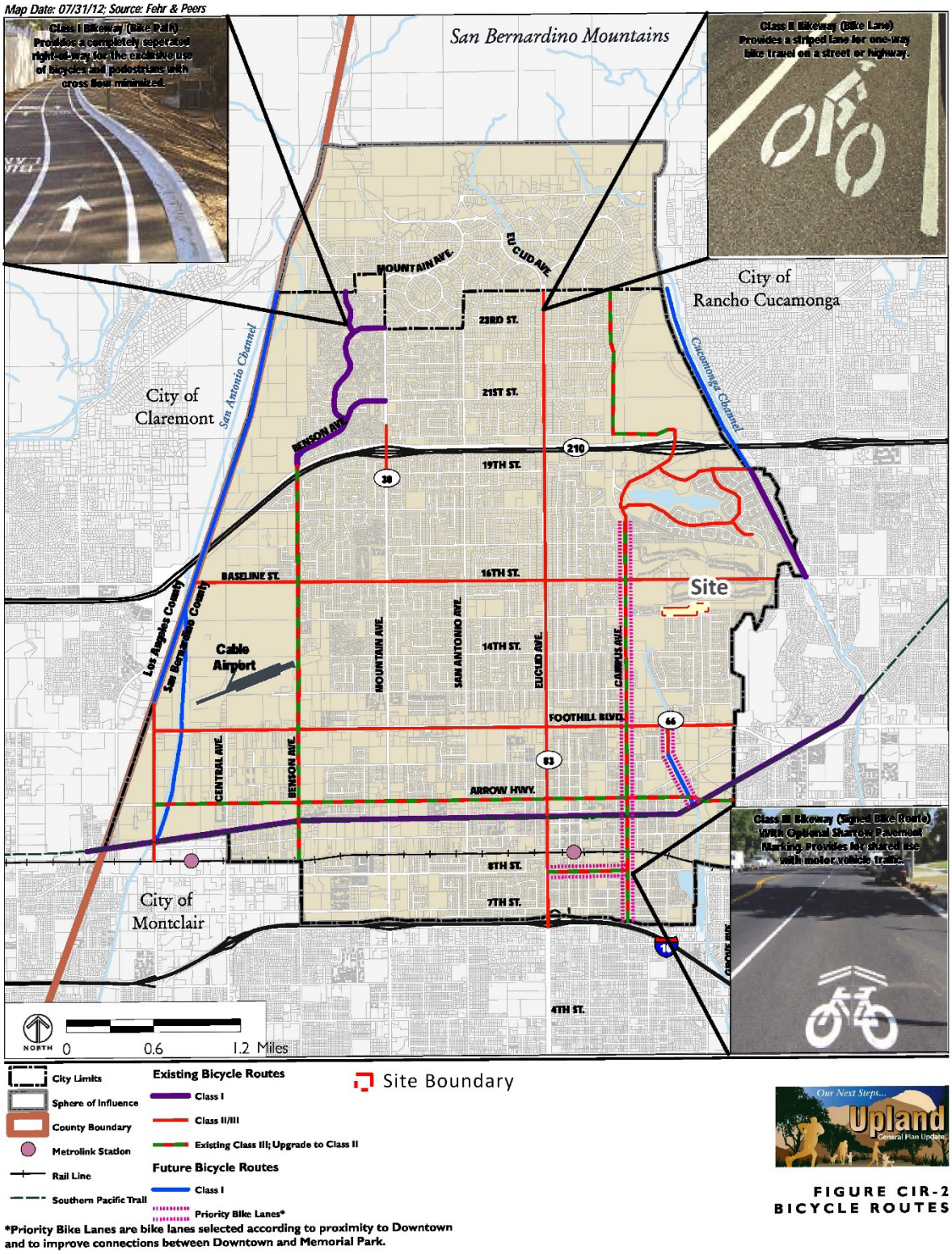
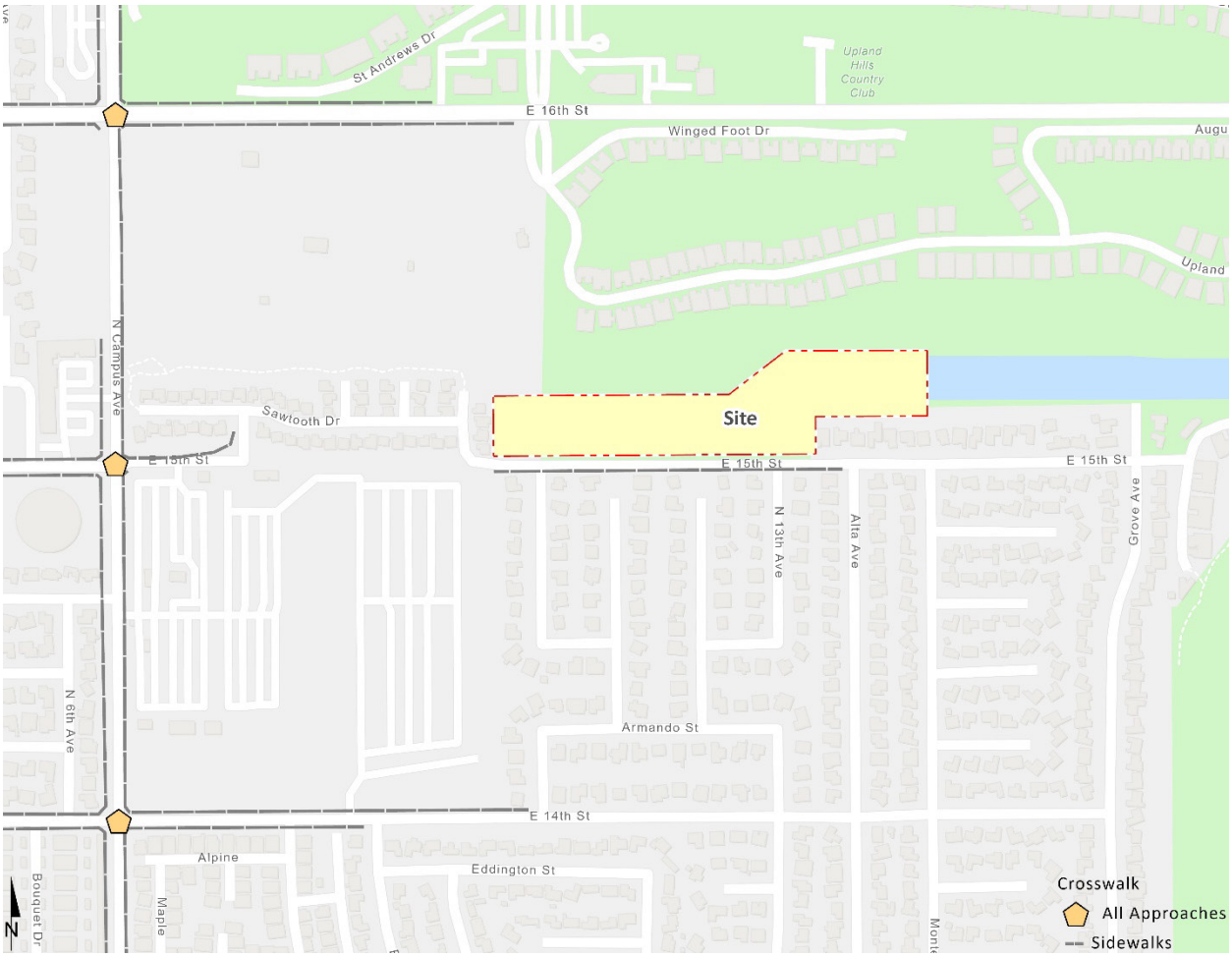



FIGURE CIR-2
BICYCLE ROUTES

## EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES



## 3.4 TRANSIT SERVICE

The study area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County, with existing bus service along Foothill Road (SR-66) (and a portion of Campus Avenue south of Foothill Boulevard) via Omnitrans Route 66 and Route 86. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

## 3.5 EXISTING (2022) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in January and August 2022 when local schools were in session and operating on normal bell schedules. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

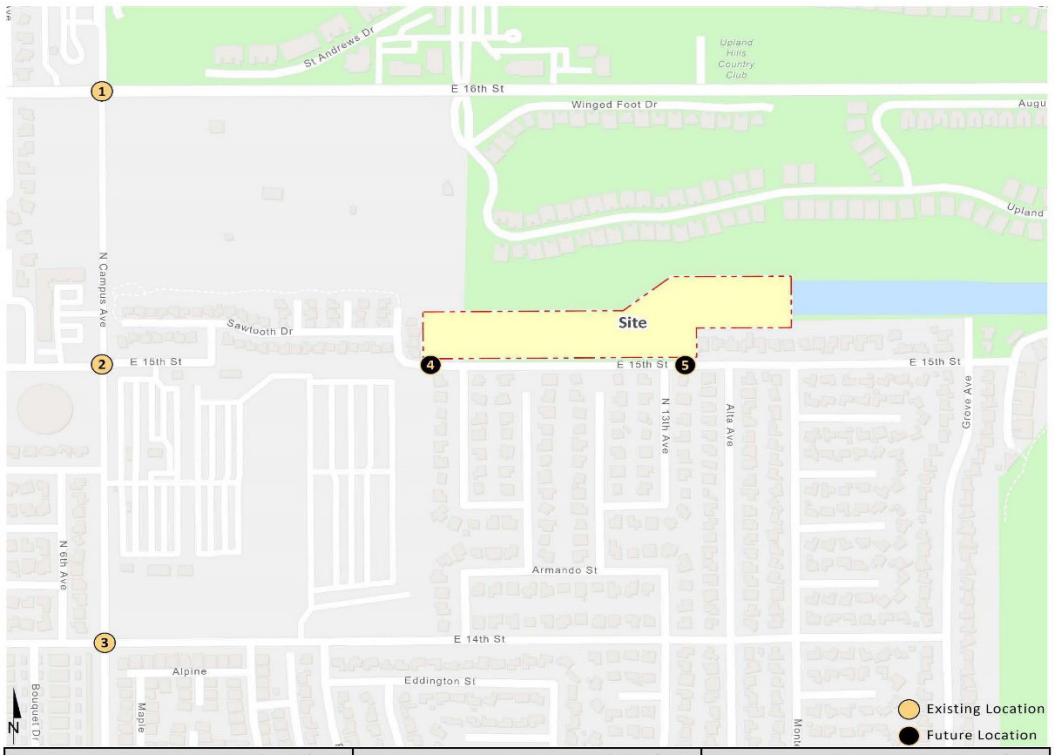
There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

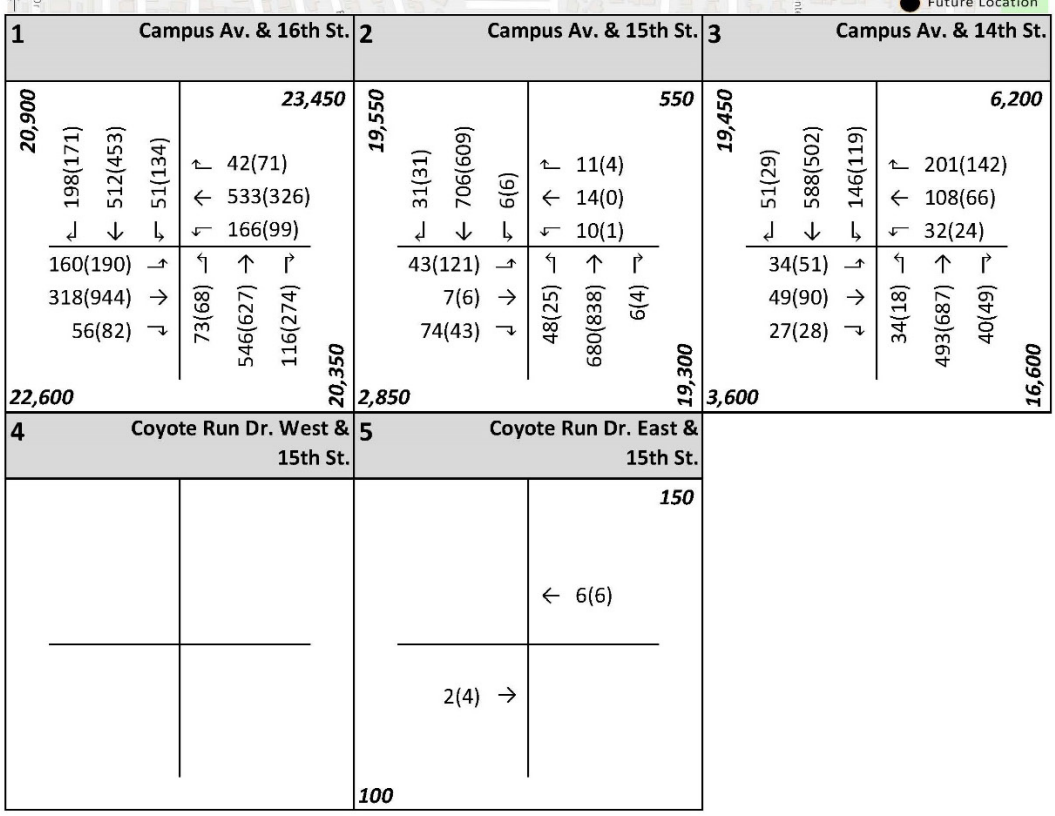
Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-6. Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.7 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.9 percent. As such, the above equation utilizing a factor of 12.7 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 6.8 percent (i.e., 1/0.079 = 12.7) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. This factor is consistent with that used for other traffic studies within the study area. Existing weekday AM and weekday PM peak hour intersection volumes are shown on Exhibit 3-6.

## EXHIBIT 3-6: EXISTING (2022) TRAFFIC VOLUMES




##(##) AM(PM) Peak Hour Intersection Volumes

***## Average Daily Trips***

## 3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates that all existing study area intersections are currently operating at acceptable LOS during the peak hours. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

**TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2022) CONDITIONS**

| # | Intersection | Traffic Control[2] | Delay[1] (secs.) | | Level of Service | |
|---|---|---|---|---|---|---|
| | | | AM | PM | AM | PM |
| 1 | Campus Av. & 16th St. | TS | 24.5 | 41.2 | C | D |
| 2 | Campus Av. & 15th St. | TS | 11.0 | 11.2 | B | B |
| 3 | Campus Av. & 14th St. | TS | 9.5 | 8.4 | A | A |
| 4 | Coyote Run Dr. West & 15th St. | | Future Intersection | | | |
| 5 | Coyote Run Dr. East & 15th St. | | Future Intersection | | | |

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] TS = Traffic Signal

## 3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections. As such, traffic signal warrant analysis was not conducted for Existing traffic conditions.

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# 4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of the development of 65 single family detached residential dwelling units. The proposed Project is anticipated to have an opening year of 2025. Vehicular access will be provided to 15th Street to the west along a new westerly alignment of 15th Street (via Coyote Run Drive West) and a secondary egress only access to the existing 15th Street (at Coyote Run Drive East). The extension of 15th Street will be separated from the existing 15th Street alignment via a proposed knuckle at Fernando Avenue where the existing 15th Street would terminate. Coyote Run Drive is a private internal roadway proposed within the Project.

## 4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) were used to estimate the Project's trip generation. (2) The trip generation summary illustrating daily and peak hour trip generation estimates for the Project in actual vehicles are also shown on Table 4-1. The proposed Project is anticipated to generate 614 two-way trip-ends per day with 46 AM peak hour trips and 61 PM peak hour trips.

**TABLE 4-1: TRIP GENERATION SUMMARY**

| Land Use[1] | ITE LU Code | Units[2] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Trip Generation Rates: | | | | | | | | | |
| Single Family Residential | 210 | DU | 0.18 | 0.52 | 0.70 | 0.59 | 0.35 | 0.94 | 9.43 |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

[2] DU = Dwelling Units

| Land Use | Quantity | Units[1] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Trip Generation Summary: | | | | | | | | | |
| Tract No. 20245 | 65 | DU | 12 | 34 | 46 | 38 | 23 | 61 | 614 |

[1] DU = Dwelling Units

## 4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. In addition, truck routes for neighboring agencies have been taken into consideration in the development of the trip distribution patterns for heavy trucks. Exhibit 4-1 shows the Project trip distribution patterns.

## 4.3 MODAL SPLIT

The potential for Project trips to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

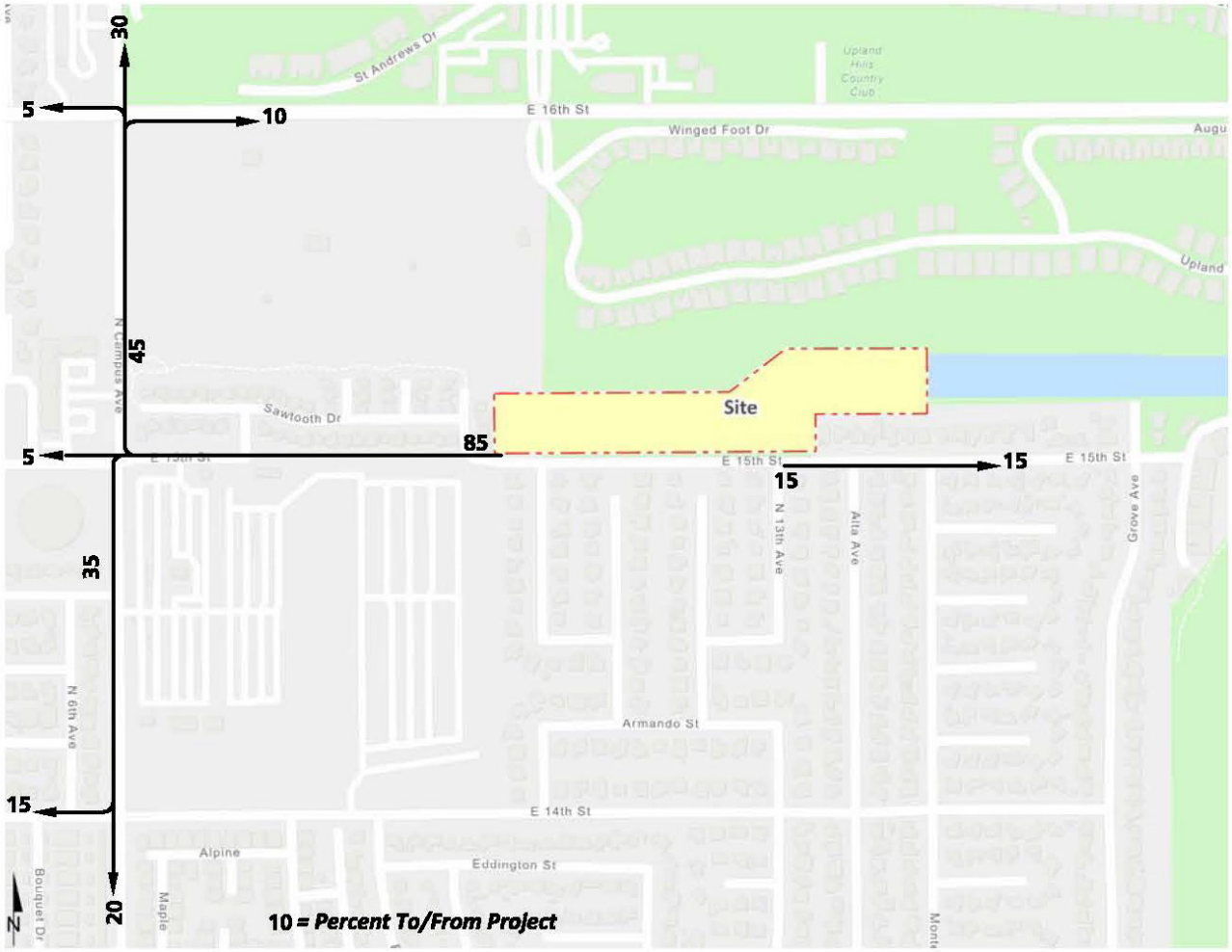
## 4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, the Project only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-2.

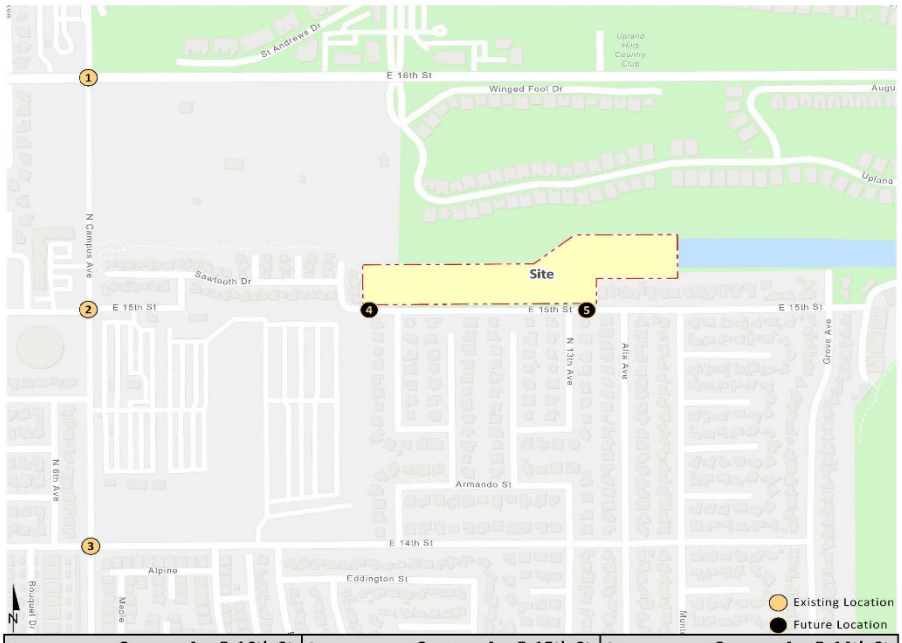
## 4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year, compounded annually, for 2025 conditions. The total ambient growth is 6.12% for 2025 traffic conditions (compounded growth of 2 percent per year over 3 years or $1.02^{3\ years}$). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

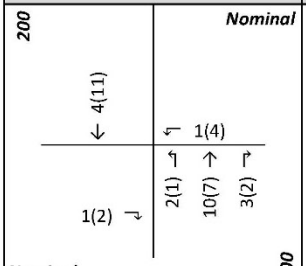
**EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION**



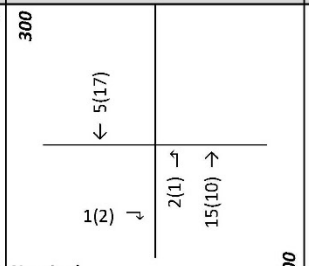
## EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES



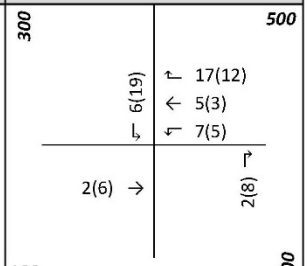

**1 Campus Av. & 16th St.**



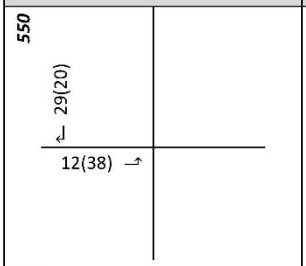

**2 Campus Av. & 15th St.**



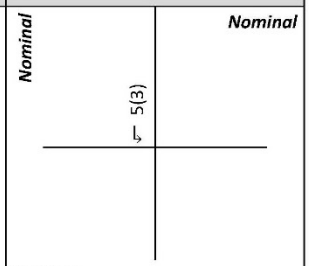

**3 Campus Av. & 14th St.**




**4 Coyote Run Dr. West & 15th St.**




**5 Coyote Run Dr. East & 15th St.**




##(##) AM(PM) Peak Hour Intersection Volumes

***## Average Daily Trips***

The currently adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) growth forecasts for the City of Upland identifies projected growth in population of 76,400 in 2016 to 93,000 in 2045, or a 21.7 percent increase over the 29-year period. (6) The change in population equates to roughly a 0.68 percent growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 25.7 percent, or 0.79 percent annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 17.6 percent, or a 0.56 percent annual growth rate. This results in an average of 0.68 percent annual growth rate. As such, the 2.0 percent per year ambient growth rate utilized in this TA would appear to conservatively estimate annual traffic growth and overstate as opposed to understate future traffic forecasts.

## 4.6 CUMULATIVE DEVELOPMENT TRAFFIC

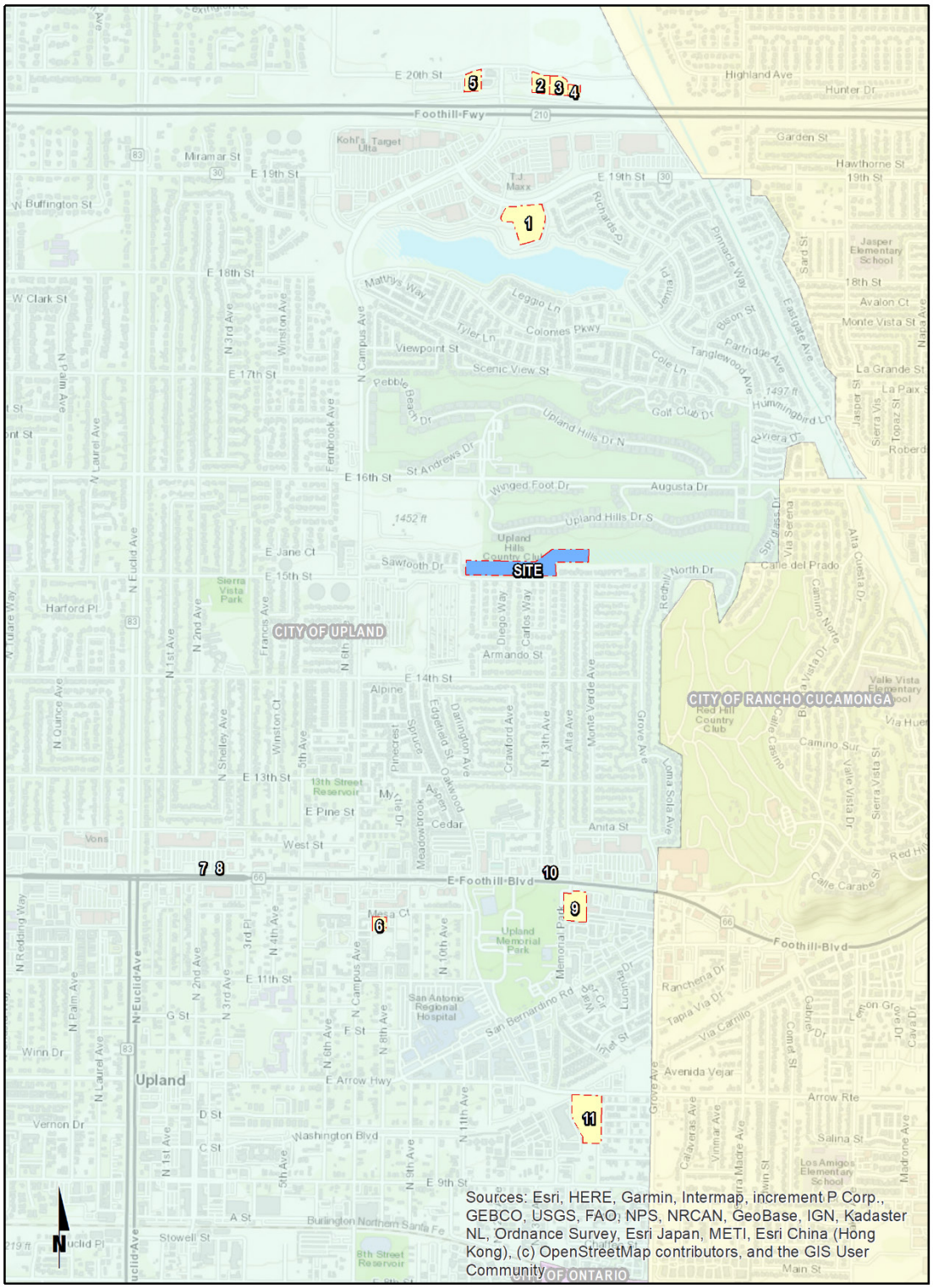
A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Upland. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e., 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-3, listed in Table 4-2, and have been considered for inclusion. Any additional traffic generated by other projects not on the cumulative projects list is likely accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*. Cumulative development projects shown in Exhibit 4-3 and listed in Table 4-2. Cumulative Only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-4.

**TABLE 4-2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY**

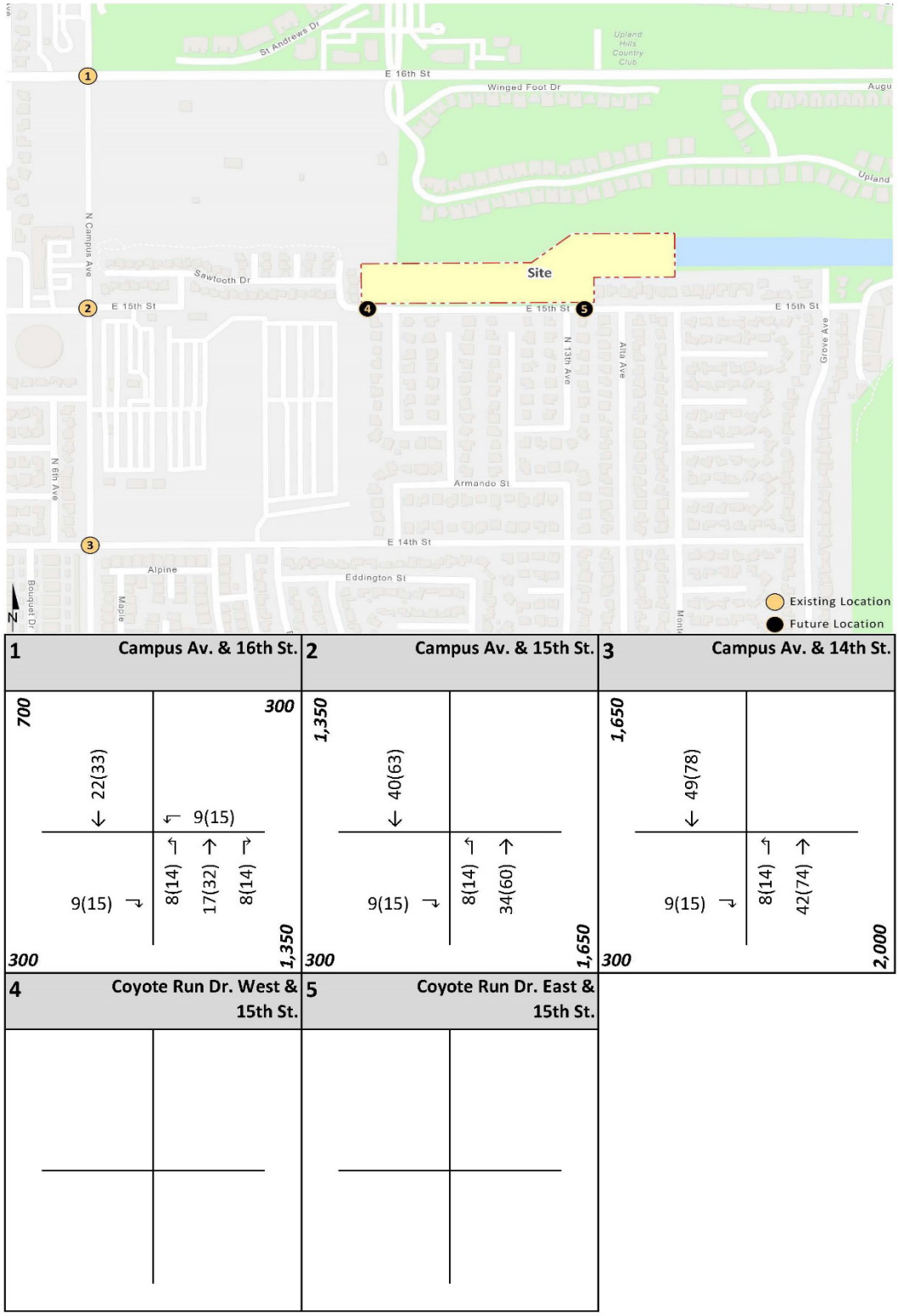
| # | Project Name | Land Use[1] | Quantity | Units[1] |
|---|---|---|---|---|
| 1 | Colony Condos | Multifamily (Mid-Rise) Residential | 60 | DU |
| 2 | Colonies Campus Center | Gasoline Station w/ Market | 4.565 | TSF |
| 3 | Colonies Campus Center | Mixed Use (Food and Retail) | 8.825 | TSF |
| 4 | Planet Car Wash | Car Wash | 2.972 | TSF |
| 5 | Colonies Self Storage | Self Storage | 164.570 | TSF |
| 6 | Mesa Court Apartments | Multifamily (Low-Rise) Residential | 60 | DU |
| 7 | Starbucks | Coffee Shop w/ Drive-Thru | 2.049 | TSF |
| 8 | Amazon Fresh at Upland Village Center | Grocery/Supermarket | 35.000 | TSF |
| 9 | Foothill Self Storage | Self Storage & Retail | 5.900 | TSF |
| 10 | Rally's Hamburgers | Fast-Food Restaurant | 1.300 | TSF |
| 11 | Rose Glen Specific Plan | Single Family Detached | 64 | DU |

[1] DU = Dwelling Units; TSF = Thousand Square Feet

## EXHIBIT 4-3: CUMULATIVE DEVELOPMENT LOCATION MAP



## EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES




##(##) AM(PM) Peak Hour Intersection Volumes

***## Average Daily Trips***

## 4.7 NEAR-TERM TRAFFIC CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast Opening Year Cumulative (2025) traffic conditions. An ambient growth factor accounts for background (area-wide) traffic increases that occur over time up to the year 2025 from the year 2022. Traffic volumes generated by the Project are then added to assess the near-term traffic conditions. The 2025 roadway network is similar to the Existing conditions roadway network, with the exception of future driveways proposed to be developed by the Project. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2025) Without Project
    - Existing 2022 counts
    - Ambient growth traffic (6.12%)
    - Cumulative Development traffic
- Opening Year Cumulative (2025) With Project
    - Existing 2022 counts
    - Ambient growth traffic (6.12%)
    - Cumulative Development traffic
    - Project traffic

# 5 OPENING YEAR CUMULATIVE (2025) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Opening Year Cumulative (2025) conditions and the resulting intersection operations and traffic signal warrant analyses.

## 5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2025) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways). This includes the proposed extension of 15th Street from its existing terminus east of Campus Avenue to Coyote Run Drive West and other frontage improvements along 15th Street east of Fernando Avenue.
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages).

## 5.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2022) traffic volumes plus an ambient growth factor of 6.12% and traffic from pending and approved cumulative development projects. The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2025) Without Project traffic conditions are shown on Exhibit 5-1.

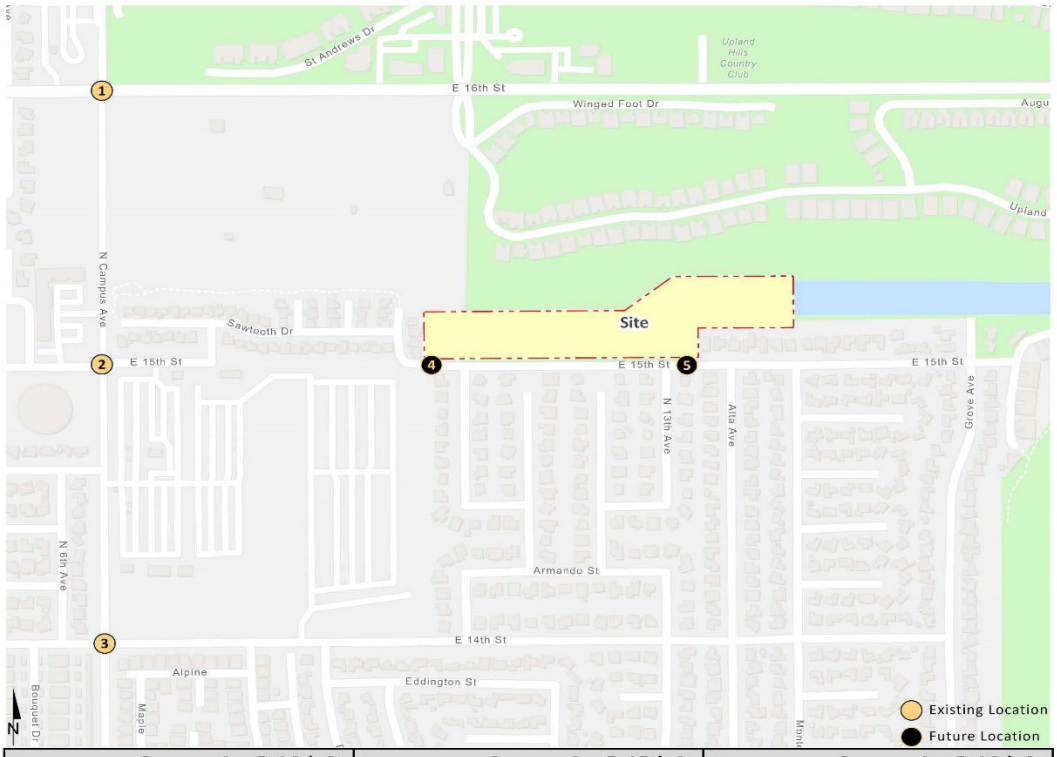
## 5.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2022) traffic volumes plus an ambient growth factor of 6.12%, traffic from pending and approved cumulative development projects, and the addition of Project traffic. The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2025) With Project traffic conditions are shown on Exhibit 5-2.

## 5.4 INTERSECTION OPERATIONS ANALYSIS

Opening Year Cumulative (2025) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized on Table 5-1 for Opening Year Cumulative traffic conditions, which indicate the study area intersections are anticipated to continue to operate at an acceptable LOS under Opening Year Cumulative (2025) Without and With Project traffic conditions. The intersection operations analysis worksheets for Opening Year Cumulative (2025) Without and With Project traffic conditions are included in Appendix 5.1 and Appendix 5.2 of this TA, respectively.

## EXHIBIT 5-1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC VOLUMES




**1 Campus Av. & 16th St.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 22,900 | 210(181) | 565(514) | 54(142) | 45(75) | 566(346) | 185(120) |
| | 170(202) | 337(1002) | 68(102) | 85(86) | 596(697) | 131(305) |
| 24,300 | | | | | | 25,200 / 22,950 |

**2 Campus Av. & 15th St.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 22,100 | 33(33) | 789(709) | 6(6) | 12(4) | 15(0) | 11(1) |
| | 46(128) | 7(6) | 88(61) | 59(41) | 756(949) | 6(4) |
| 3,350 | | | | | | 550 / 22,150 |

**3 Campus Av. & 14th St.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 22,300 | 54(31) | 673(611) | 155(126) | 213(151) | 115(70) | 34(25) |
| | 36(54) | 52(96) | 38(45) | 44(33) | 565(803) | 42(52) |
| 4,100 | | | | | | 6,600 / 19,600 |

**4 Coyote Run Dr. West & 15th St.**

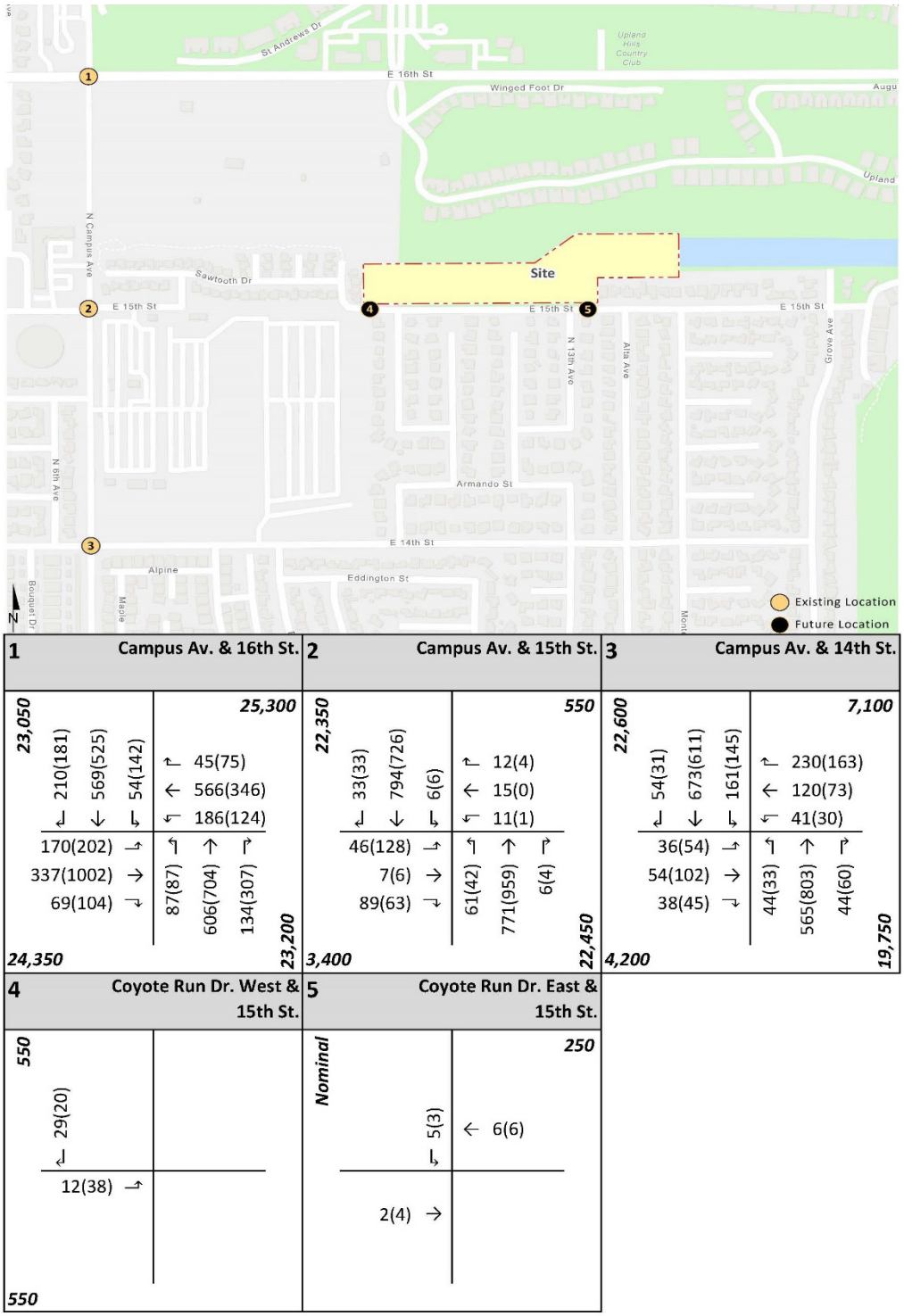
**5 Coyote Run Dr. East & 15th St.**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 150 |
| | | | | | 6(6) | |
| | | | | 2(4) | | |
| 100 | | | | | | |

##(##) AM(PM) Peak Hour Intersection Volumes

***## Average Daily Trips***

## EXHIBIT 5-2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC VOLUMES




##(##) AM(PM) Peak Hour Intersection Volumes

***## Average Daily Trips***

**TABLE 5-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2025) CONDITIONS**

| # | Intersection | Traffic Control[2] | 2025 Without Project Delay[1] (secs.) AM | 2025 Without Project Delay[1] (secs.) PM | 2025 Without Project Level of Service AM | 2025 Without Project Level of Service PM | 2025 With Project Delay[1] (secs.) AM | 2025 With Project Delay[1] (secs.) PM | 2025 With Project Level of Service AM | 2025 With Project Level of Service PM |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Campus Av. & 16th St. | TS | 27.9 | 51.2 | C | D | 28.1 | 52.2 | C | D |
| 2 | Campus Av. & 15th St. | TS | 11.5 | 11.8 | B | B | 11.5 | 11.8 | B | B |
| 3 | Campus Av. & 14th St. | TS | 10.3 | 8.8 | B | A | 10.9 | 9.1 | B | A |
| 4 | Coyote Run Dr. West & 15th St. | **UC** | Future Intersection | | | | 0.0 | 0.0 | A | A |
| 5 | Coyote Run Dr. East & 15th St. | **CSS** | Future Intersection | | | | 8.6 | 8.6 | A | A |

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; UC = Uncontrolled; TS = Traffic Signal; **CSS** = Improvement

## 5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

No traffic signal warrants have been conducted for Opening Year Cumulative (2025) Without Project traffic conditions as all of the existing intersections are currently signalized. The traffic signal warrant analysis for Opening Year Cumulative (2025) With Project traffic conditions are based on the planning level ADT volume-based traffic signal warrants for the intersection of Coyote Run Drive East on 15th Street. The intersection is not anticipated to warrant a traffic signal (see Appendix 5.3).

## 5.6 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. There are no study area intersections anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2025) traffic conditions. As such, no intersection improvements have been recommended.

# 6 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Upland are funded through a combination of improvements constructed by the Project, development impact fee programs. Fee programs applicable to the Project are described below.

## 6.1 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in September 2017. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study.

While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past, and will continue to fund, new transportation facilities in San Bernardino County, including within the City of Upland.

## 6.2 CITY OF UPLAND DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of Upland adopted the latest update to their DIF program in November 2017. Fees from new residential, commercial and industrial development are collected to fund Measure "I" compliant regional facilities as well as local facilities. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

After the City's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Engineering Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds. The City's DIF program establishes a timeline to fund, design, and build the improvements.

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# 7 REFERENCES

1. **Fehr & Peers.** *City of Upland Traffic Impact Analysis Guidelines.* Upland : s.n., July 2020.
2. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 2021.
3. **San Bernardino County Transportation Authority.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).
6. **Southern California Association of Governments (SCAG).** *2020 Regional Transportation Plan / Sustainable Communities Strategy.* Adopted September 2020.

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# APPENDIX 1.1: APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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July 7, 2022

Mr. Robert Dalquest
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

## VILLA SERNA (TRACT NO. 20245) FOCUSED TRAFFIC ANALYSIS SCOPING AGREEMENT

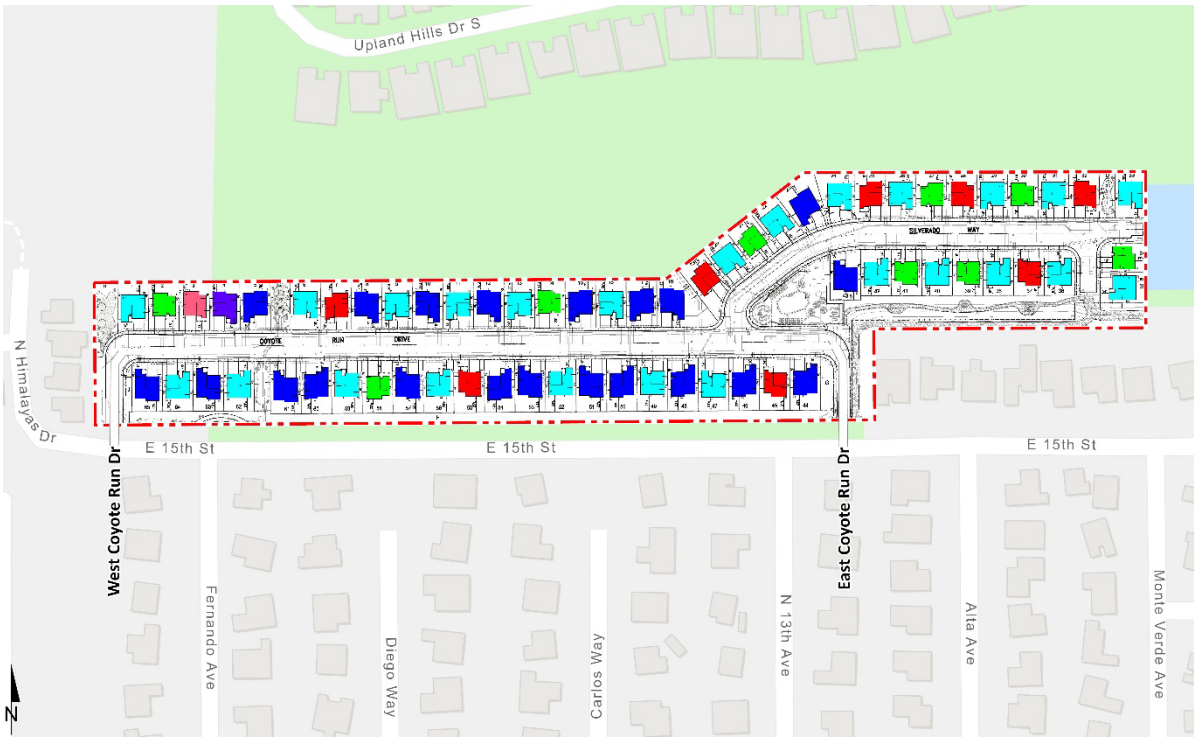
Mr. Robert Dalquest,

The firm of Urban Crossroads, Inc. is pleased to submit this scoping letter regarding the focused traffic analysis for Villa Serna development (**Project**), which is located northeast of Fernando Avenue and 15th Street Baxter in the City of Upland. This letter describes the proposed Project trip generation, trip distribution, and analysis methodology, which have been used to establish the draft proposed Project study area and analysis locations. The following scope of work is based on the City's Traffic Impact Analysis Guidelines (dated July 2020) (**City Guidelines**).

## PROPOSED PROJECT

The Project is proposed to consist of 65 single family detached residential dwelling units (see Exhibit 1). The proposed Project is anticipated to have an opening year of 2025. Access is proposed via two connections of Coyote Run Drive (private internal road) to the west and east on 15th Street. The Project will also construct a western extension of 15th Street to the existing terminus east of Campus Avenue, which will serve as the primary access for the Project.

**EXHIBIT 1: PRELIMINARY SITE PLAN**




## TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021) was used to estimate the trip generation. Trip generation rates are summarized on Table 1.

The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project are shown on Table 1. The proposed Project is anticipated to generate 614 two-way vehicle trip-ends per day with 46 AM peak hour trips and 61 PM peak hour (see Table 1).

**TABLE 1: PROJECT TRIP GENERATION SUMMARY**

| Land Use[1] | ITE LU Code | Units[2] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Trip Generation Rates: | | | | | | | | | |
| Single Family Residential | 210 | DU | 0.18 | 0.52 | 0.70 | 0.59 | 0.35 | 0.94 | 9.43 |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

[2] DU = Dwelling Units

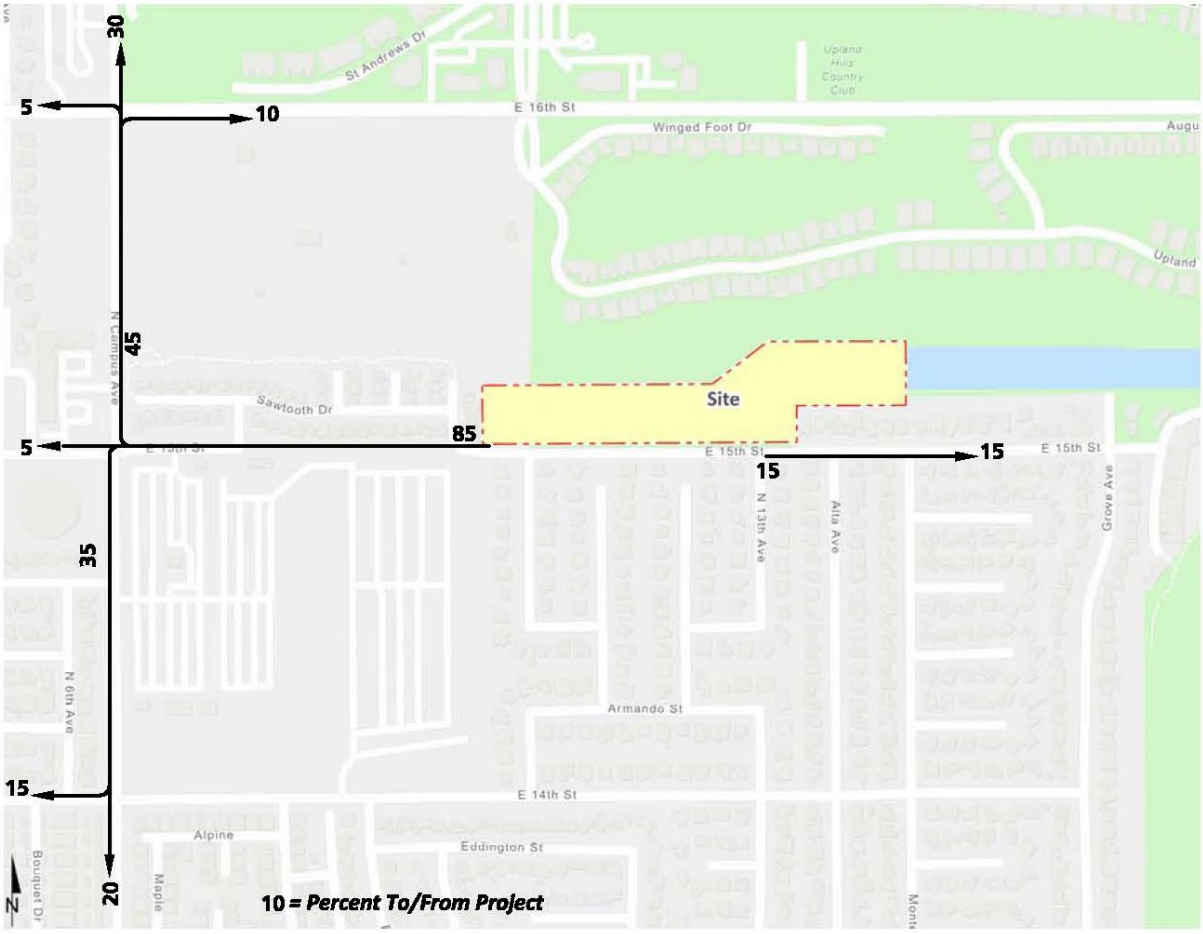
| Land Use | Quantity | Units[1] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Trip Generation Summary: | | | | | | | | | |
| Tract No. 20245 | 65 | DU | 12 | 34 | 46 | 38 | 23 | 61 | 614 |

[1] DU = Dwelling Units

## TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. Exhibit 2 shows the Project trip distribution patterns.

**EXHIBIT 2: PROJECT TRIP DISTRIBUTION**




## ANALYSIS SCENARIOS

Consistent with the City's TIA Guidelines, intersection analysis will be provided for the following scenarios:

- Existing (2022) Conditions
- Opening Year Cumulative (2025) Without Project
- Opening Year Cumulative (2025) With Project

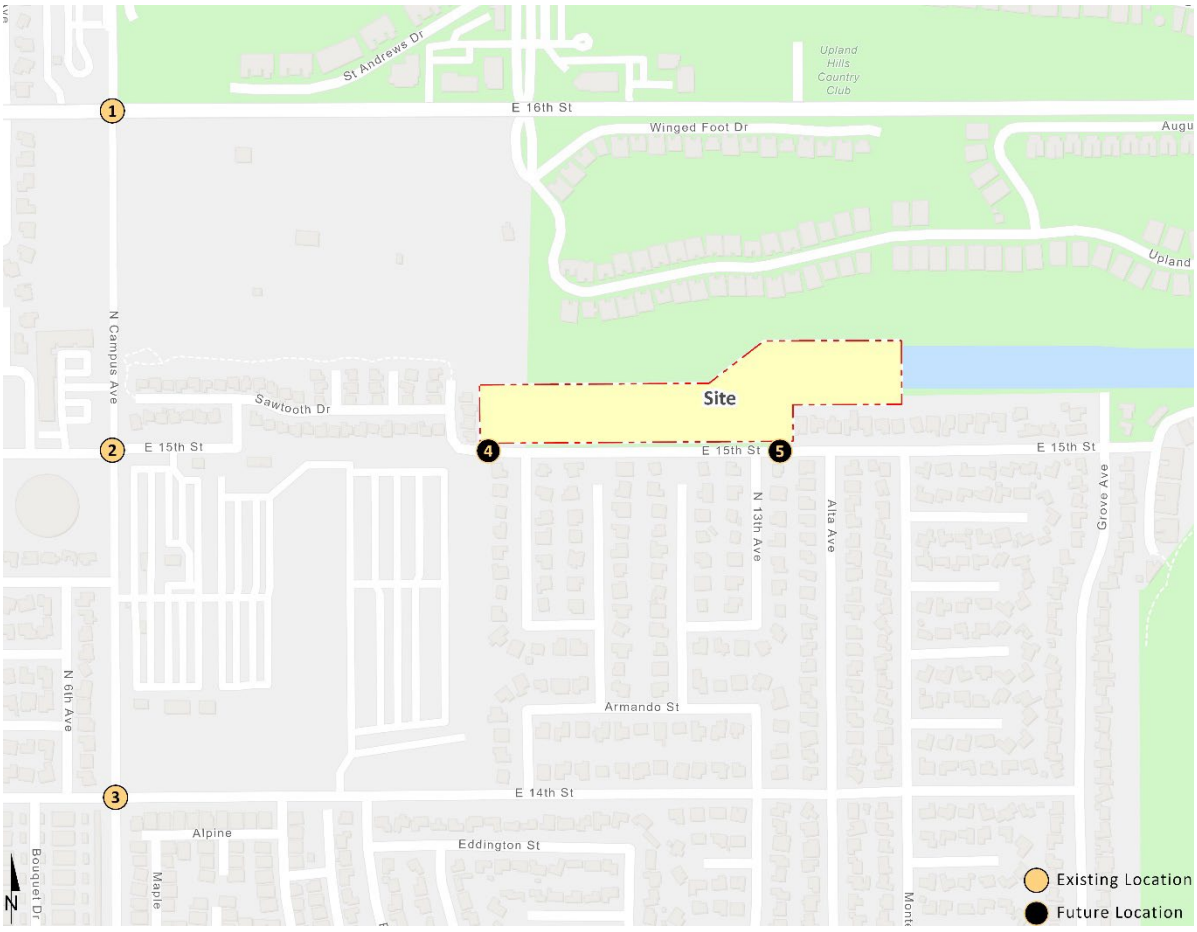
All study area intersections will be evaluated using the Highway Capacity Manual (HCM) 6th Edition analysis methodology.

## STUDY AREA INTERSECTIONS

Based on the Project's anticipated travel patterns and trip generation characteristics, the following study area intersection locations shown on Exhibit 3 and listed below were selected for analysis:

| # | Intersection |
|---|---|
| 1 | Campus Av. & 16th St. |
| 2 | Campus Av. & 15th St. |
| 3 | Campus Av. & 14th St. |
| 4 | Coyote Run Dr. West & 15th St. |
| 5 | Coyote Run Dr. East & 15th St. |

**EXHIBIT 3: STUDY AREA**



## EXISTING COUNT DATA

We are proposing to conduct new traffic counts on a typical weekday when local schools are open and operating on normal bell schedules (after August 22, 2022). No additional adjustments are proposed for the purposes of establishing the existing baseline conditions.

## GENERAL PLAN CONSISTENCY REQUIREMENTS

Consistent with the City's TIA Guidelines, the following criteria will be applied for the traffic analysis: Strive to maintain LOS D at all intersections outside of the Downtown Specific Plan area and the Transit Priority Roadways except where such improvements are physically infeasible or would negatively affect bicyclists, pedestrians, or transit users (Policy CIR-1.1 of the General Plan).

- Any study intersection operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to a LOS E or F shall identify improvements to improve operations to LOS D or better.
- Any study intersection that is operating at LOS E or F without project traffic shall improve the intersection operations to LOS D or better.

## AMBIENT GROWTH

Consistent with other studies performed in the area, an ambient growth rate of 2.0% per year is proposed for the study area intersections to approximate background traffic growth not identified by nearby cumulative development projects. The rate will be compounded over a 3-year period (i.e., $1.02^{3\text{years}} = 1.0612$ or 6.12% for 2025).

## SIGNAL TIMING

It is requested that the City provide any signal timing that should be considered for signalized study area intersections within the City.

## CUMULATIVE PROJECTS

The cumulative projects are listed on Table 2 and are shown graphically on Exhibit 4. It is requested that the City provide an updated list of cumulative development projects for inclusion in the traffic study.

## SPECIAL ISSUES

The following special issues will also be addressed:

- *Traffic Signal Warrant Analysis*: Traffic signal warrant analysis will be performed for all full-access unsignalized study area intersections utilizing the California MUTCD peak-hour warrants for existing intersections, and the Caltrans daily (Planning level) warrant for new intersections.
- *Site Access Evaluation*: The turn pocket lengths will be determined through peak hour traffic simulations developed using Synchro and SimTraffic software in an effort to identify the required storage capacity for turn lanes at each Project driveway.

**TABLE 2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY**

| # | Project Name | Land Use[1] | Quantity | Units[1] |
|---|---|---|---|---|
| 1 | Colony Condos | Multifamily (Mid-Rise) Residential | 60 | DU |
| 2 | Colonies Campus Center | Gasoline Station w/ Market | 4.565 | TSF |
| 3 | Colonies Campus Center | Mixed Use (Food and Retail) | 8.825 | TSF |
| 4 | Planet Car Wash | Car Wash | 2.972 | TSF |
| 5 | Colonies Self Storage | Self Storage | 164.570 | TSF |
| 6 | Mesa Court Apartments | Multifamily (Low-Rise) Residential | 60 | DU |
| 7 | Starbucks | Coffee Shop w/ Drive-Thru | 2.049 | TSF |
| 8 | Amazon Fresh at Upland Village Center | Grocery/Supermarket | 35.000 | TSF |
| 9 | Foothill Self Storage | Self Storage & Retail | 5.900 | TSF |
| 10 | Rally's Hamburgers | Fast-Food Restaurant | 1.300 | TSF |
| 11 | Rose Glen Specific Plan | Single Family Detached | 64 | DU |

[1] DU = Dwelling Units; TSF = Thousand Square Feet

If you have any questions or comments, I can be reached at cso@urbanxroads.com.

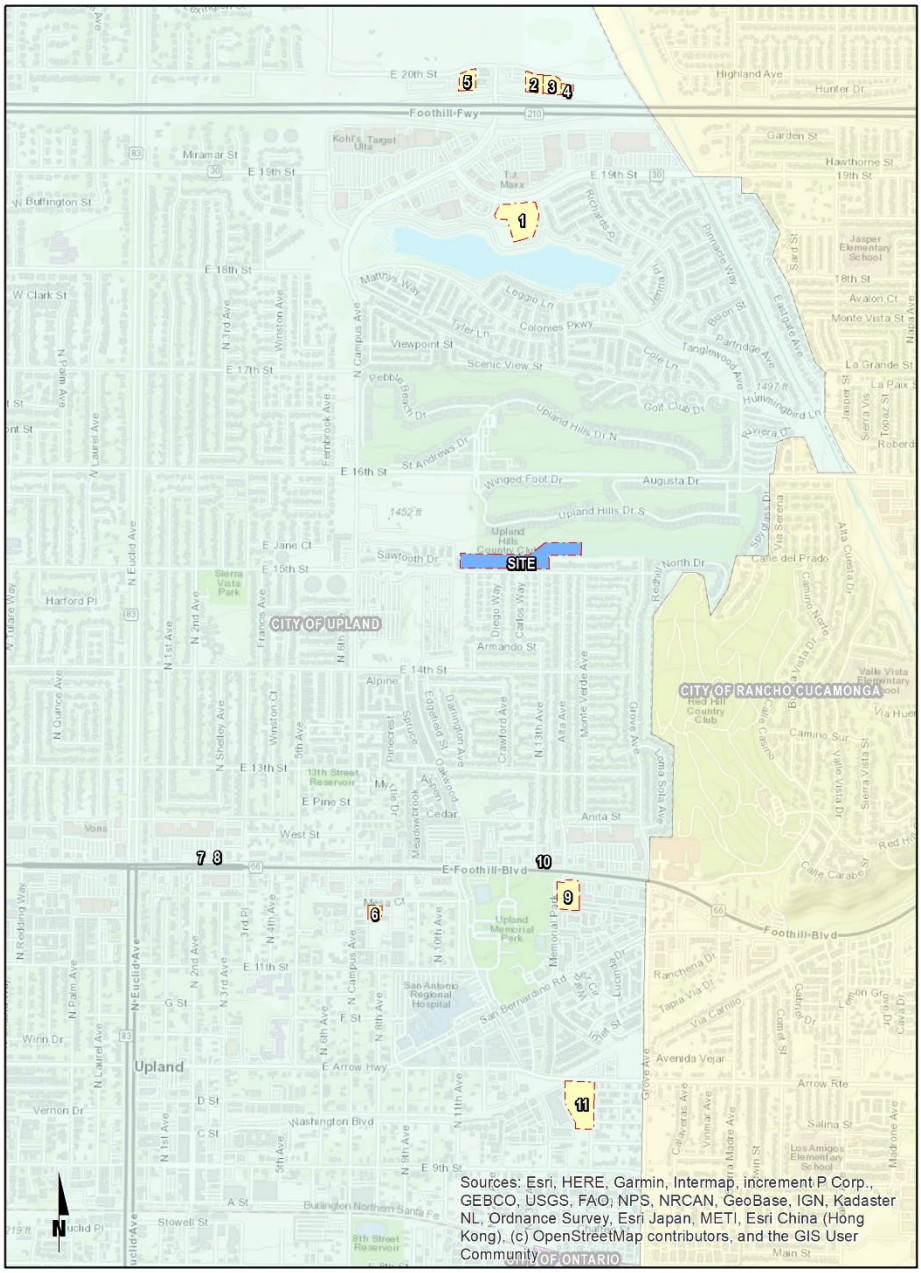
Respectfully submitted,

URBAN CROSSROADS, INC.



Charlene So, PE
Principal

## EXHIBIT 4: CUMULATIVE DEVELOPMENT LOCATION MAP



# APPENDIX 1.2: SITE ADJACENT QUEUES

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## Intersection: 4: 15th St. & Coyote Run Dr. West

| Movement | SB |
|---|---|
| Directions Served | R |
| Maximum Queue (ft) | 43 |
| Average Queue (ft) | 20 |
| 95th Queue (ft) | 43 |
| Link Distance (ft) | 98 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Intersection: 5: 15th St. & Coyote Run Dr. East

| Movement | SB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 30 |
| Average Queue (ft) | 4 |
| 95th Queue (ft) | 21 |
| Link Distance (ft) | 194 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Zone Summary

Zone wide Queuing Penalty: 0

## Intersection: 4: 15th St. & Coyote Run Dr. West

| Movement | EB | SB |
|---|---|---|
| Directions Served | L | R |
| Maximum Queue (ft) | 57 | 40 |
| Average Queue (ft) | 22 | 14 |
| 95th Queue (ft) | 53 | 37 |
| Link Distance (ft) | 173 | 98 |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (ft) | | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

## Intersection: 5: 15th St. & Coyote Run Dr. East

| Movement | SB |
|---|---|
| Directions Served | LR |
| Maximum Queue (ft) | 31 |
| Average Queue (ft) | 3 |
| 95th Queue (ft) | 19 |
| Link Distance (ft) | 194 |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (ft) | |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

## Zone Summary

Zone wide Queuing Penalty: 0

# APPENDIX 3.1: TRAFFIC COUNTS

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# INTERSECTION TURNING MOVEMENT COUNTS

T218

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Aug 23, 22

LOCATION: Upland
NORTH & SOUTH: Campus
EAST & WEST: 16th

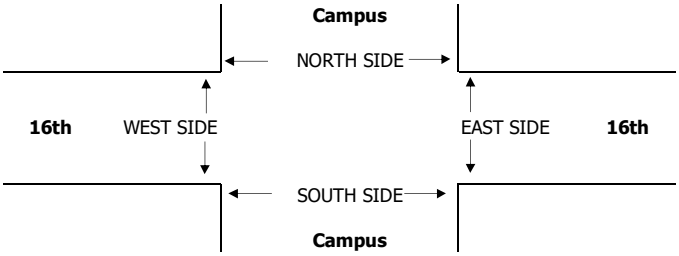
PROJECT #: SC3596
LOCATION #: 1
CONTROL: SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

☑ Add U-Turns to Left Turns

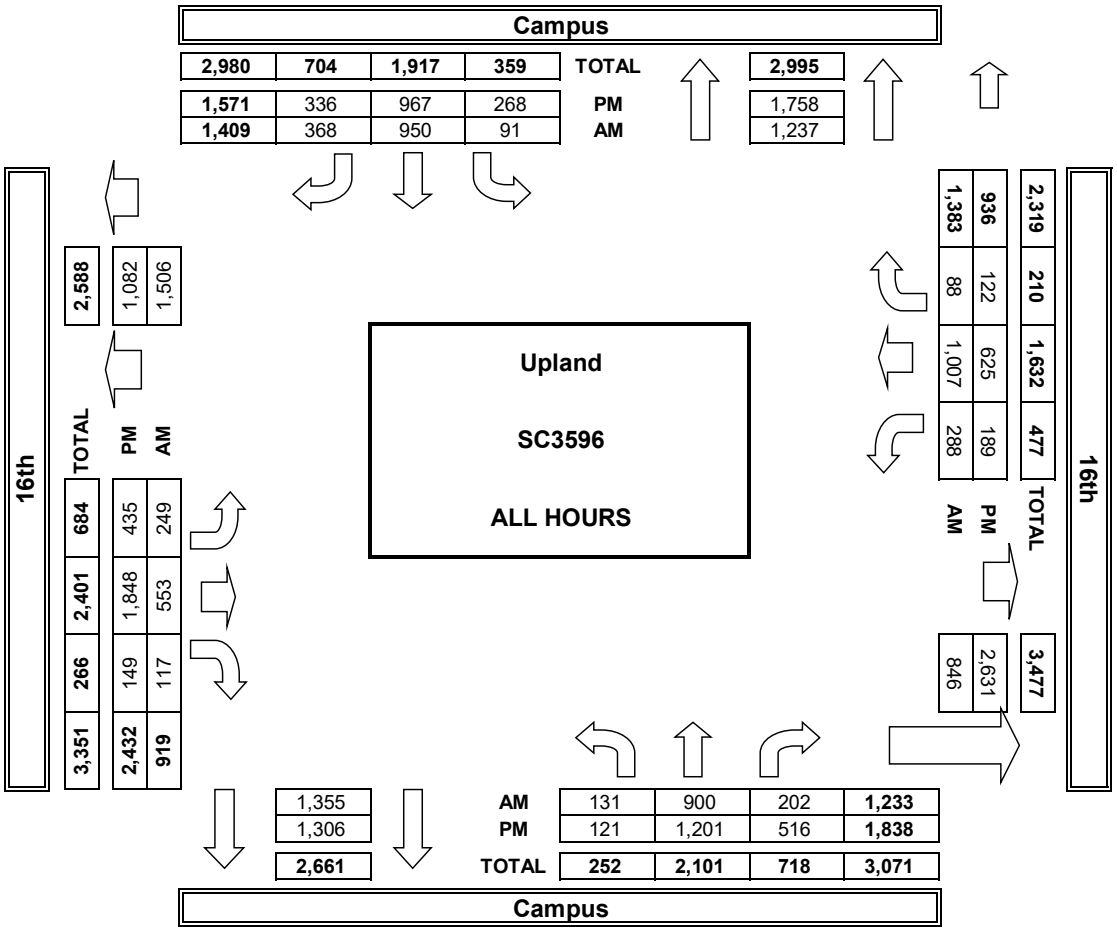
| | | NORTHBOUND Campus | | | SOUTHBOUND Campus | | | EASTBOUND 16th | | | WESTBOUND 16th | | | | U-TURNS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 2 | NR 0 | SL 1 | ST 2 | SR 0 | EL 1 | ET 2 | ER 0 | WL 1 | WT 2 | WR 0 | TOTAL | NB 0 | SB 0 | EB 0 | WB 0 | TTL |
| AM | 7:00 AM | 8 | 80 | 13 | 8 | 93 | 43 | 21 | 46 | 14 | 26 | 94 | 8 | 454 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 22 | 89 | 20 | 7 | 124 | 38 | 12 | 58 | 12 | 42 | 138 | 8 | 570 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 20 | 147 | 22 | 14 | 150 | 59 | 36 | 72 | 18 | 43 | 158 | 9 | 748 | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 18 | 162 | 27 | 10 | 125 | 48 | 51 | 100 | 16 | 49 | 136 | 12 | 754 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 13 | 127 | 36 | 11 | 136 | 41 | 41 | 79 | 10 | 35 | 115 | 10 | 654 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 22 | 110 | 31 | 16 | 101 | 50 | 32 | 67 | 12 | 39 | 124 | 11 | 615 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 16 | 107 | 29 | 17 | 110 | 53 | 29 | 59 | 18 | 26 | 116 | 16 | 596 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 12 | 78 | 24 | 8 | 111 | 36 | 27 | 72 | 17 | 28 | 126 | 14 | 553 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 131 | 900 | 202 | 91 | 950 | 368 | 249 | 553 | 117 | 288 | 1,007 | 88 | 4,944 | 0 | 0 | 0 | 0 | 0 |
| | APPROACH % | 11% | 73% | 16% | 6% | 67% | 26% | 27% | 60% | 13% | 21% | 73% | 6% | | | | | | |
| | APP/DEPART | 1,233 | / | 1,237 | 1,409 | / | 1,355 | 919 | / | 846 | 1,383 | / | 1,506 | 0 | | | | | |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | | | | | | |
| | VOLUMES | 73 | 546 | 116 | 51 | 512 | 198 | 160 | 318 | 56 | 166 | 533 | 42 | 2,771 | | | | | |
| | APPROACH % | 10% | 74% | 16% | 7% | 67% | 26% | 30% | 60% | 10% | 22% | 72% | 6% | | | | | | |
| | PEAK HR FACTOR | | 0.888 | | | 0.853 | | | 0.799 | | | 0.882 | | 0.919 | | | | | |
| | APP/DEPART | 735 | / | 748 | 761 | / | 734 | 534 | / | 485 | 741 | / | 804 | 0 | | | | | |
| PM | 4:00 PM | 13 | 139 | 61 | 38 | 108 | 39 | 78 | 225 | 17 | 22 | 66 | 12 | 818 | 0 | 0 | 1 | 0 | 1 |
| | 4:15 PM | 16 | 132 | 66 | 35 | 144 | 37 | 60 | 241 | 14 | 21 | 75 | 13 | 854 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 10 | 153 | 56 | 34 | 120 | 33 | 62 | 216 | 18 | 21 | 64 | 14 | 801 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 14 | 150 | 59 | 27 | 142 | 56 | 45 | 222 | 18 | 26 | 94 | 12 | 865 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 18 | 162 | 56 | 31 | 108 | 32 | 45 | 239 | 18 | 22 | 80 | 11 | 822 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 18 | 171 | 64 | 41 | 121 | 40 | 41 | 223 | 14 | 31 | 88 | 24 | 876 | 1 | 1 | 0 | 0 | 2 |
| | 5:30 PM | 16 | 147 | 77 | 31 | 112 | 50 | 52 | 241 | 25 | 23 | 79 | 18 | 871 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 16 | 147 | 77 | 31 | 112 | 49 | 52 | 241 | 25 | 23 | 79 | 18 | 870 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 121 | 1,201 | 516 | 268 | 967 | 336 | 435 | 1,848 | 149 | 189 | 625 | 122 | 6,777 | 1 | 1 | 1 | 0 | 3 |
| | APPROACH % | 7% | 65% | 28% | 17% | 62% | 21% | 18% | 76% | 6% | 20% | 67% | 13% | | | | | | |
| | APP/DEPART | 1,838 | / | 1,758 | 1,571 | / | 1,306 | 2,432 | / | 2,631 | 936 | / | 1,082 | 0 | | | | | |
| | BEGIN PEAK HR | | 5:00 PM | | | | | | | | | | | | | | | | |
| | VOLUMES | 68 | 627 | 274 | 134 | 453 | 171 | 190 | 944 | 82 | 99 | 326 | 71 | 3,439 | | | | | |
| | APPROACH % | 7% | 65% | 28% | 18% | 60% | 23% | 16% | 78% | 7% | 20% | 66% | 14% | | | | | | |
| | PEAK HR FACTOR | | 0.958 | | | 0.938 | | | 0.956 | | | 0.867 | | 0.981 | | | | | |
| | APP/DEPART | 969 | / | 889 | 758 | / | 635 | 1,216 | / | 1,351 | 496 | / | 564 | 0 | | | | | |

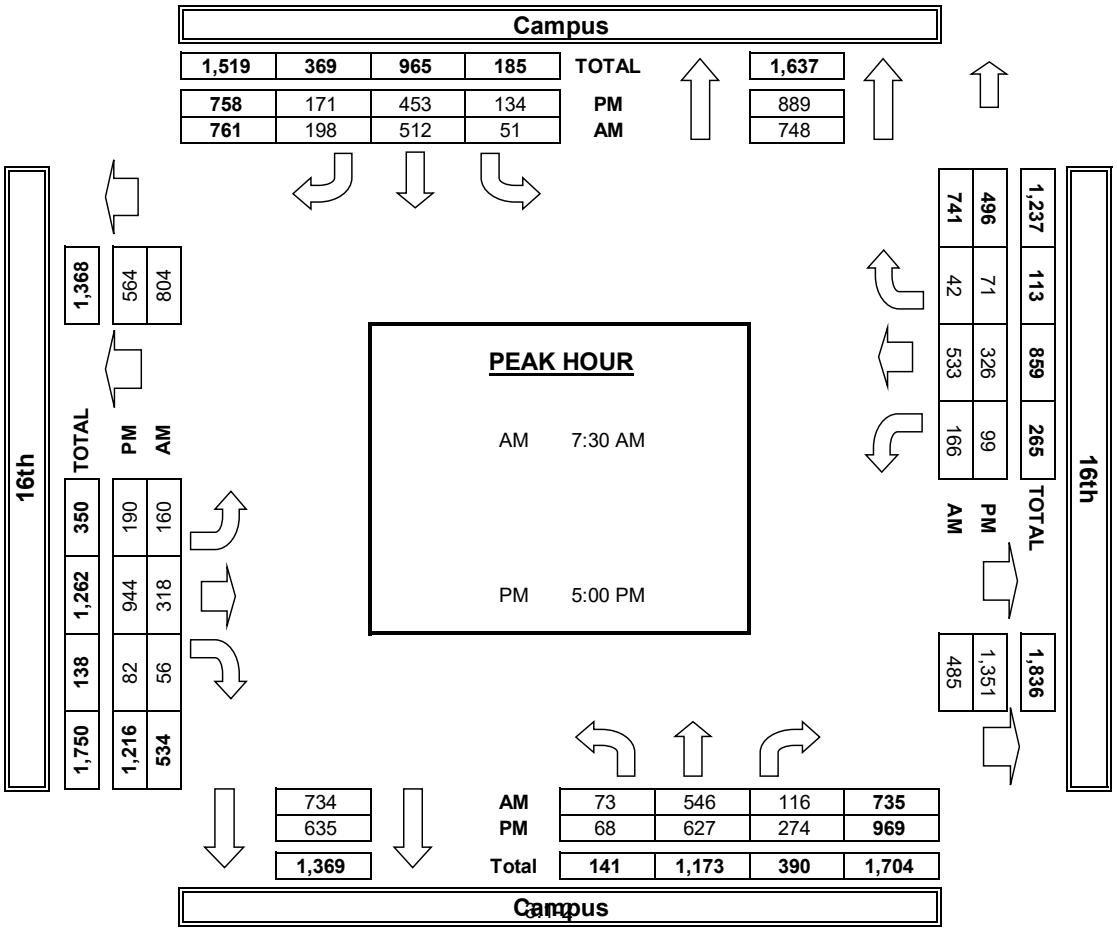



| | | PEDESTRIAN + BIKE CROSSINGS | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | NS | SS | ES | WS | TOTAL |
| AM | 7:00 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 7:15 AM | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 3 |
| | 7:30 AM | 5 | 0 | 2 | 1 | 8 | 2 | 0 | 2 | 0 | 4 | 3 | 0 | 0 | 1 | 4 |
| | 7:45 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 8:00 AM | 0 | 5 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 4 |
| | 8:15 AM | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| | 8:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 8:45 AM | 2 | 0 | 2 | 0 | 4 | 2 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 9 | 9 | 5 | 2 | 25 | 4 | 2 | 4 | 0 | 10 | 5 | 7 | 1 | 2 | 15 |
| | AM BEGIN PEAK HR | 7:30 AM | | | | | 2 | 2 | 2 | 0 | 6 | | | | | |
| PM | 4:00 PM | 1 | 0 | 1 | 1 | 3 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 |
| | 4:15 PM | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| | 4:45 PM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 5:00 PM | 2 | 2 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 5 |
| | 5:15 PM | 3 | 0 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 5 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 9 | 2 | 4 | 3 | 18 | 1 | 0 | 1 | 3 | 5 | 8 | 2 | 3 | 0 | 13 |
| | PM BEGIN PEAK HR | 5:00 PM | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |

**AimTD LLC**

TURNING MOVEMENT COUNTS



# INTERSECTION TURNING MOVEMENT COUNTS



PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Aug 23, 22

LOCATION: Upland
NORTH & SOUTH: Campus
EAST & WEST: 15th

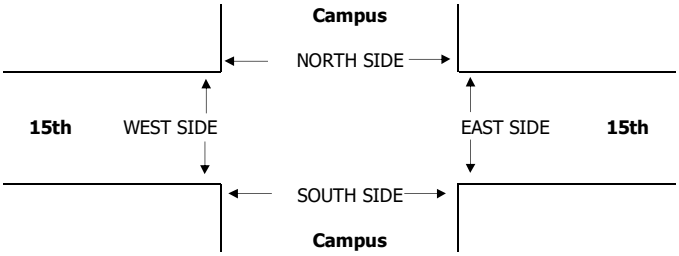
PROJECT #: SC3596
LOCATION #: 2
CONTROL: SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

☑ Add U-Turns to Left Turns

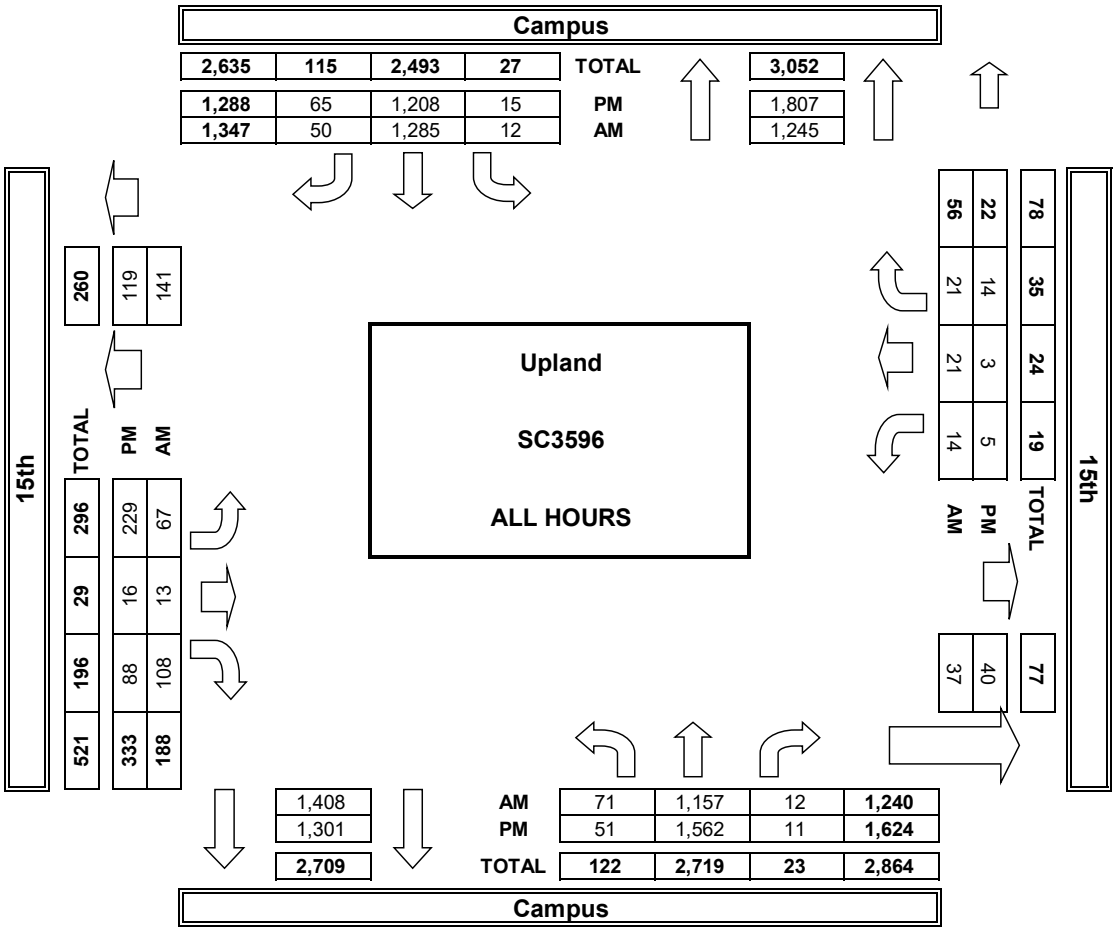
| | | NORTHBOUND Campus | | | SOUTHBOUND Campus | | | EASTBOUND 15th | | | WESTBOUND 15th | | | | U-TURNS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 2 | NR 0 | SL 1 | ST 2 | SR 0 | EL 1 | ET 1 | ER 0 | WL 1 | WT 1 | WR 0 | TOTAL | NB 0 | SB 0 | EB 0 | WB 0 | TTL |
| AM | 7:00 AM | 9 | 99 | 2 | 1 | 125 | 8 | 5 | 1 | 4 | 0 | 2 | 1 | 257 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 6 | 123 | 1 | 1 | 154 | 4 | 5 | 0 | 9 | 2 | 3 | 4 | 312 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 19 | 163 | 1 | 0 | 212 | 8 | 7 | 2 | 5 | 5 | 6 | 4 | 432 | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 14 | 185 | 1 | 5 | 177 | 5 | 18 | 1 | 37 | 1 | 2 | 5 | 451 | 1 | 0 | 0 | 0 | 1 |
| | 8:00 AM | 7 | 171 | 2 | 0 | 165 | 8 | 14 | 4 | 20 | 2 | 3 | 2 | 398 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 8 | 161 | 2 | 1 | 152 | 10 | 4 | 0 | 12 | 2 | 3 | 0 | 355 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 4 | 138 | 3 | 1 | 154 | 3 | 10 | 2 | 15 | 2 | 0 | 5 | 337 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 4 | 117 | 0 | 3 | 146 | 4 | 4 | 3 | 6 | 0 | 2 | 0 | 289 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 71 | 1,157 | 12 | 12 | 1,285 | 50 | 67 | 13 | 108 | 14 | 21 | 21 | 2,831 | 1 | 0 | 0 | 0 | 1 |
| | APPROACH % | 6% | 93% | 1% | 1% | 95% | 4% | 36% | 7% | 57% | 25% | 38% | 38% | | | | | | |
| | APP/DEPART | 1,240 | / | 1,245 | 1,347 | / | 1,408 | 188 | / | 37 | 56 | / | 141 | 0 | | | | | |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | | | | | | |
| | VOLUMES | 48 | 680 | 6 | 6 | 706 | 31 | 43 | 7 | 74 | 10 | 14 | 11 | 1,636 | | | | | |
| | APPROACH % | 7% | 93% | 1% | 1% | 95% | 4% | 35% | 6% | 60% | 29% | 40% | 31% | | | | | | |
| | PEAK HR FACTOR | | 0.918 | | | 0.844 | | | 0.554 | | | 0.583 | | 0.907 | | | | | |
| | APP/DEPART | 734 | / | 734 | 743 | / | 791 | 124 | / | 19 | 35 | / | 92 | 0 | | | | | |
| PM | 4:00 PM | 4 | 187 | 2 | 3 | 138 | 8 | 27 | 4 | 13 | 0 | 0 | 4 | 390 | 0 | 1 | 0 | 0 | 1 |
| | 4:15 PM | 7 | 182 | 2 | 1 | 169 | 6 | 28 | 1 | 9 | 2 | 1 | 1 | 409 | 0 | 1 | 0 | 0 | 1 |
| | 4:30 PM | 10 | 192 | 0 | 3 | 150 | 11 | 20 | 4 | 14 | 1 | 1 | 0 | 406 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 10 | 192 | 0 | 0 | 171 | 10 | 32 | 0 | 13 | 1 | 0 | 1 | 430 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 2 | 210 | 0 | 3 | 141 | 4 | 37 | 5 | 9 | 0 | 0 | 1 | 412 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 7 | 230 | 2 | 0 | 153 | 9 | 25 | 0 | 12 | 0 | 0 | 1 | 439 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 6 | 206 | 2 | 3 | 144 | 8 | 27 | 1 | 9 | 0 | 0 | 1 | 407 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 5 | 163 | 3 | 2 | 142 | 9 | 33 | 1 | 9 | 1 | 1 | 5 | 374 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 51 | 1,562 | 11 | 15 | 1,208 | 65 | 229 | 16 | 88 | 5 | 3 | 14 | 3,267 | 0 | 2 | 0 | 0 | 2 |
| | APPROACH % | 3% | 96% | 1% | 1% | 94% | 5% | 69% | 5% | 26% | 23% | 14% | 64% | | | | | | |
| | APP/DEPART | 1,624 | / | 1,807 | 1,288 | / | 1,301 | 333 | / | 40 | 22 | / | 119 | 0 | | | | | |
| | BEGIN PEAK HR | | 4:45 PM | | | | | | | | | | | | | | | | |
| | VOLUMES | 25 | 838 | 4 | 6 | 609 | 31 | 121 | 6 | 43 | 1 | 0 | 4 | 1,688 | | | | | |
| | APPROACH % | 3% | 97% | 0% | 1% | 94% | 5% | 71% | 4% | 25% | 20% | 0% | 80% | | | | | | |
| | PEAK HR FACTOR | | 0.907 | | | 0.892 | | | 0.833 | | | 0.625 | | 0.961 | | | | | |
| | APP/DEPART | 867 | / | 963 | 646 | / | 653 | 170 | / | 16 | 5 | / | 56 | 0 | | | | | |

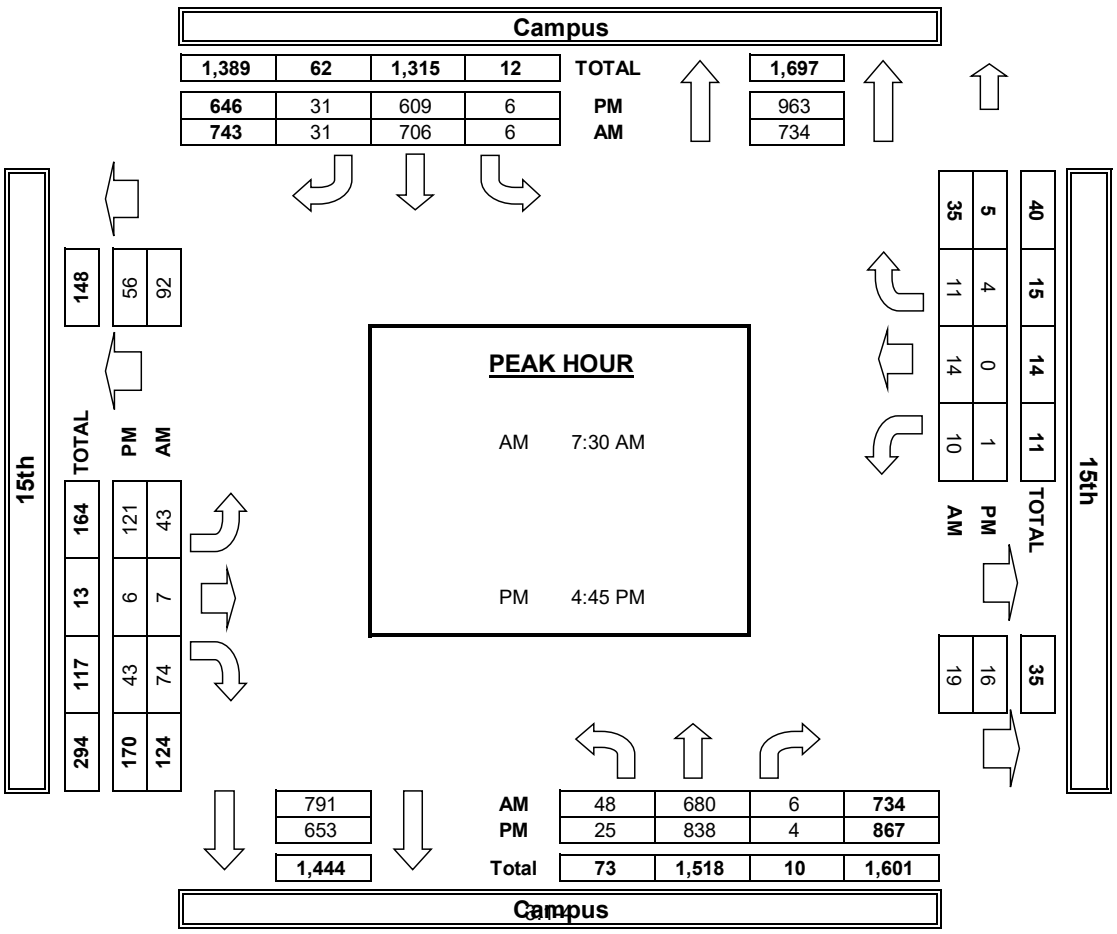



| | | PEDESTRIAN + BIKE CROSSINGS | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | NS | SS | ES | WS | TOTAL |
| AM | 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 |
| | 7:30 AM | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| | 7:45 AM | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 1 | 1 |
| | TOTAL | 1 | 2 | 8 | 4 | 15 | 1 | 2 | 5 | 1 | 9 | 0 | 0 | 3 | 3 | 6 |
| | AM BEGIN PEAK HR | | | 7:30 AM | | | 1 | 2 | 3 | 0 | 6 | | | | | |
| PM | 4:00 PM | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 1 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | 5:15 PM | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 |
| | 5:30 PM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 0 | 6 | 2 | 8 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 4 | 0 | 4 |
| | PM BEGIN PEAK HR | | | 4:45 PM | | | 0 | 0 | 2 | 0 | 2 | | | | | |

**AimTD LLC**

TURNING MOVEMENT COUNTS



# INTERSECTION TURNING MOVEMENT COUNTS

T218

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Aug 23, 22

LOCATION: Upland
NORTH & SOUTH: Campus
EAST & WEST: 14th

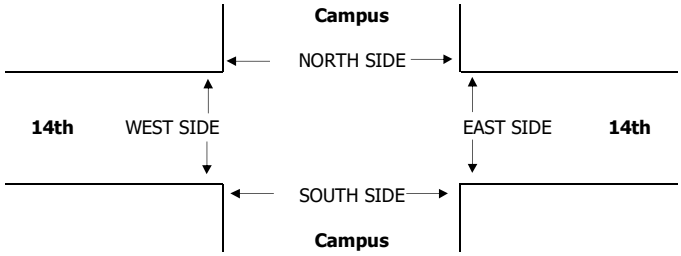
PROJECT #: SC3596
LOCATION #: 3
CONTROL: SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

☑ Add U-Turns to Left Turns

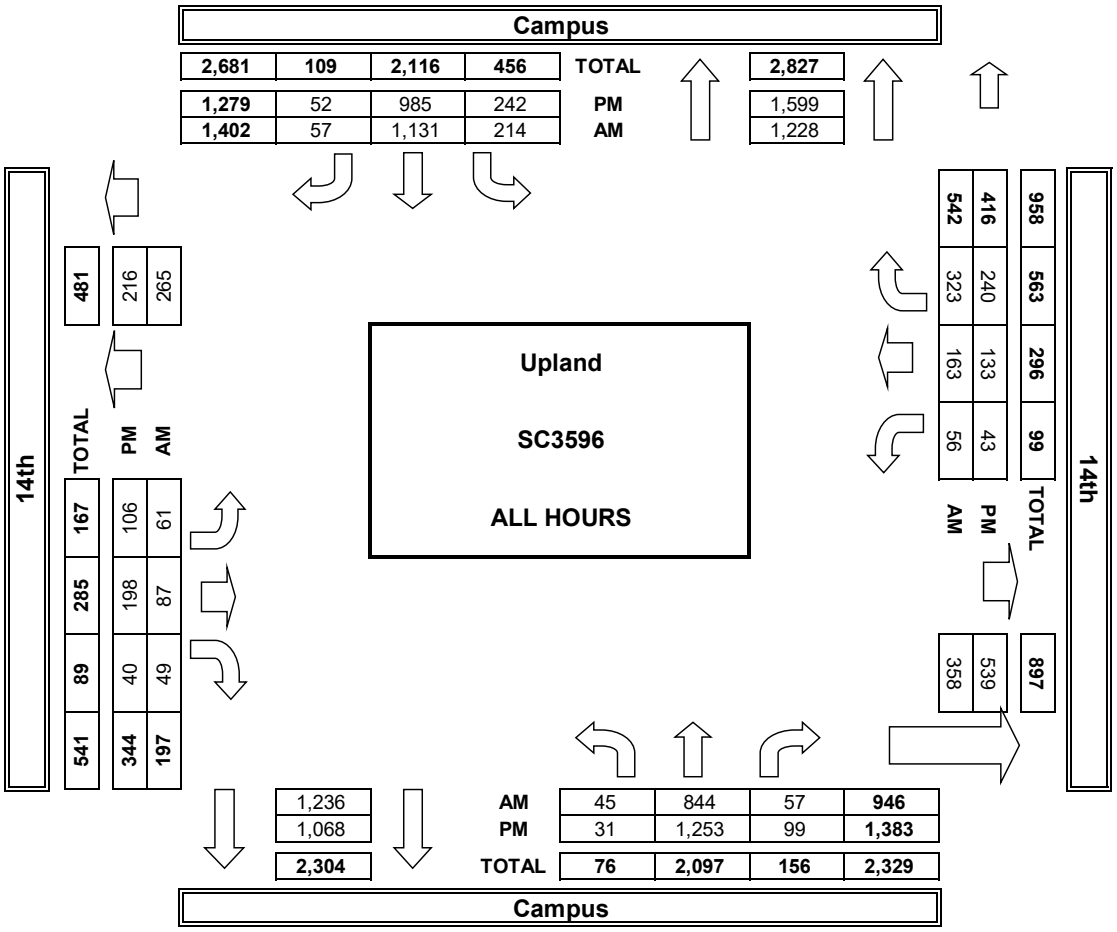
| | | NORTHBOUND Campus | | | SOUTHBOUND Campus | | | EASTBOUND 14th | | | WESTBOUND 14th | | | | U-TURNS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 1 | NT 2 | NR 0 | SL 1 | ST 2 | SR 0 | EL 1 | ET 1 | ER 0 | WL 1 | WT 1 | WR 0 | TOTAL | NB 0 | SB 0 | EB 0 | WB 0 | TTL |
| AM | 7:00 AM | 2 | 73 | 5 | 13 | 113 | 1 | 7 | 6 | 2 | 6 | 12 | 29 | 269 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 3 | 78 | 3 | 16 | 155 | 2 | 5 | 11 | 7 | 5 | 14 | 46 | 345 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 11 | 132 | 3 | 23 | 183 | 12 | 8 | 9 | 8 | 7 | 40 | 64 | 500 | 0 | 0 | 0 | 0 | 0 |
| | 7:45 AM | 12 | 139 | 10 | 48 | 155 | 23 | 8 | 9 | 10 | 8 | 28 | 45 | 495 | 0 | 0 | 0 | 0 | 0 |
| | 8:00 AM | 6 | 123 | 11 | 39 | 124 | 9 | 8 | 23 | 9 | 11 | 22 | 37 | 422 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 5 | 99 | 16 | 36 | 126 | 7 | 10 | 8 | 0 | 6 | 18 | 55 | 386 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 4 | 109 | 5 | 24 | 141 | 2 | 6 | 13 | 10 | 7 | 18 | 28 | 367 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 2 | 91 | 4 | 15 | 134 | 1 | 9 | 8 | 3 | 6 | 11 | 19 | 303 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 45 | 844 | 57 | 214 | 1,131 | 57 | 61 | 87 | 49 | 56 | 163 | 323 | 3,087 | 0 | 0 | 0 | 0 | 0 |
| | APPROACH % | 5% | 89% | 6% | 15% | 81% | 4% | 31% | 44% | 25% | 10% | 30% | 60% | | | | | | |
| | APP/DEPART | 946 | / | 1,228 | 1,402 | / | 1,236 | 197 | / | 358 | 542 | / | 265 | 0 | | | | | |
| | BEGIN PEAK HR | | 7:30 AM | | | | | | | | | | | | | | | | |
| | VOLUMES | 34 | 493 | 40 | 146 | 588 | 51 | 34 | 49 | 27 | 32 | 108 | 201 | 1,803 | | | | | |
| | APPROACH % | 6% | 87% | 7% | 19% | 75% | 6% | 31% | 45% | 25% | 9% | 32% | 59% | | | | | | |
| | PEAK HR FACTOR | | 0.880 | | | 0.868 | | | 0.688 | | | 0.768 | | 0.902 | | | | | |
| | APP/DEPART | 567 | / | 728 | 785 | / | 647 | 110 | / | 235 | 341 | / | 193 | 0 | | | | | |
| PM | 4:00 PM | 4 | 144 | 12 | 43 | 110 | 8 | 12 | 32 | 2 | 2 | 13 | 21 | 403 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 2 | 147 | 15 | 34 | 134 | 3 | 15 | 25 | 3 | 7 | 28 | 25 | 438 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 3 | 177 | 8 | 31 | 111 | 7 | 12 | 25 | 11 | 4 | 16 | 29 | 434 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 6 | 164 | 11 | 30 | 154 | 9 | 15 | 19 | 3 | 8 | 12 | 22 | 453 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 4 | 164 | 17 | 23 | 114 | 4 | 13 | 26 | 6 | 6 | 17 | 45 | 439 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 5 | 182 | 13 | 35 | 123 | 9 | 11 | 20 | 8 | 6 | 21 | 46 | 479 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 5 | 147 | 13 | 22 | 124 | 7 | 16 | 27 | 5 | 4 | 12 | 29 | 411 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 2 | 128 | 10 | 24 | 115 | 5 | 12 | 24 | 2 | 6 | 14 | 23 | 365 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 31 | 1,253 | 99 | 242 | 985 | 52 | 106 | 198 | 40 | 43 | 133 | 240 | 3,422 | 0 | 0 | 0 | 0 | 0 |
| | APPROACH % | 2% | 91% | 7% | 19% | 77% | 4% | 31% | 58% | 12% | 10% | 32% | 58% | | | | | | |
| | APP/DEPART | 1,383 | / | 1,599 | 1,279 | / | 1,068 | 344 | / | 539 | 416 | / | 216 | 0 | | | | | |
| | BEGIN PEAK HR | | 4:30 PM | | | | | | | | | | | | | | | | |
| | VOLUMES | 18 | 687 | 49 | 119 | 502 | 29 | 51 | 90 | 28 | 24 | 66 | 142 | 1,805 | | | | | |
| | APPROACH % | 2% | 91% | 6% | 18% | 77% | 4% | 30% | 53% | 17% | 10% | 28% | 61% | | | | | | |
| | PEAK HR FACTOR | | 0.943 | | | 0.842 | | | 0.880 | | | 0.795 | | 0.942 | | | | | |
| | APP/DEPART | 754 | / | 880 | 650 | / | 554 | 169 | / | 258 | 232 | / | 113 | 0 | | | | | |

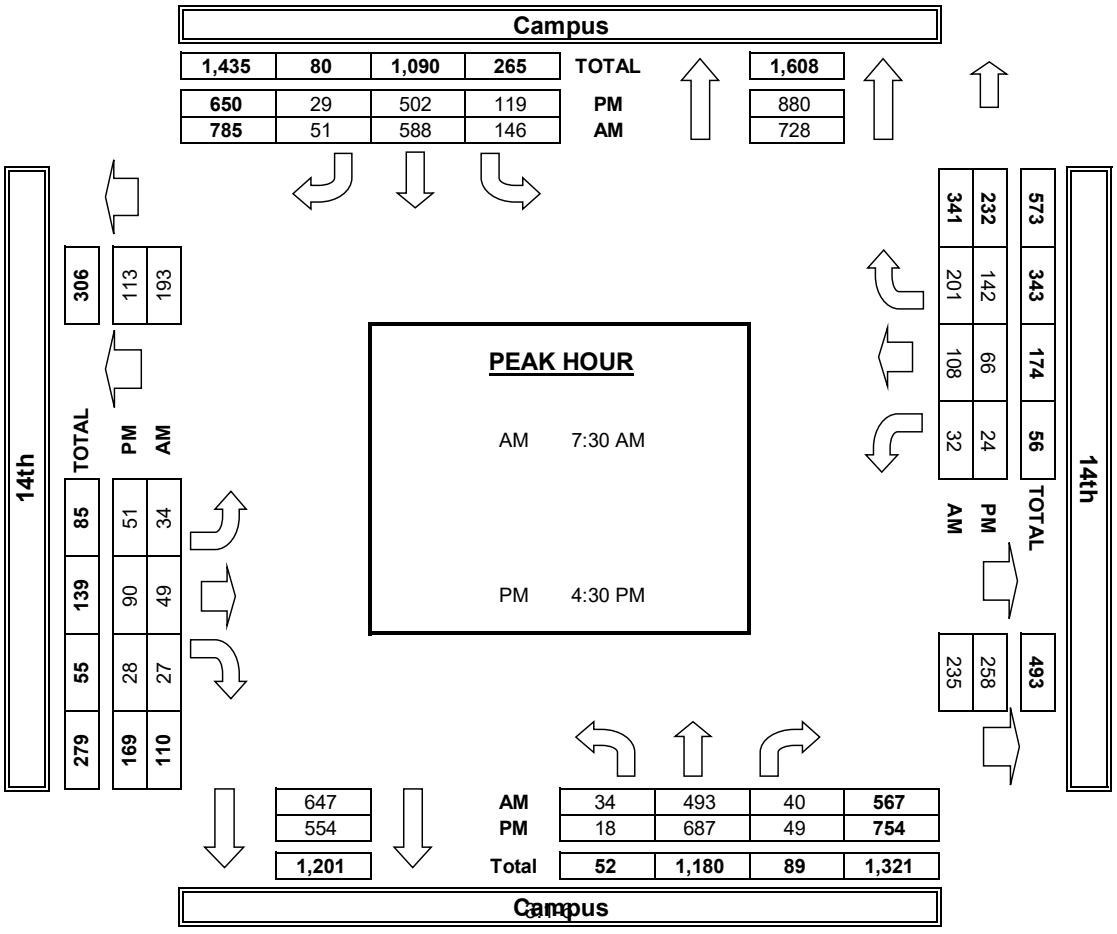



| | | PEDESTRIAN + BIKE CROSSINGS | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | NS | SS | ES | WS | TOTAL |
| AM | 7:00 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | 7:15 AM | 3 | 1 | 3 | 0 | 7 | 3 | 1 | 3 | 0 | 7 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| | 7:45 AM | 3 | 2 | 0 | 0 | 5 | 3 | 1 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 |
| | 8:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 1 | 1 | 2 | 1 | 5 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 1 | 2 |
| | 8:30 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 1 | 2 | 3 | 6 | 0 | 0 | 2 | 2 | 4 | 0 | 1 | 0 | 1 | 2 |
| | TOTAL | 7 | 8 | 8 | 5 | 28 | 7 | 4 | 7 | 2 | 20 | 0 | 4 | 1 | 3 | 8 |
| | AM BEGIN PEAK HR | | | 7:30 AM | | | 4 | 2 | 2 | 0 | 8 | | | | | |
| PM | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 5:00 PM | 1 | 0 | 2 | 0 | 3 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 |
| | 5:15 PM | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| | 5:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 1 | 2 | 4 | 0 | 7 | 1 | 1 | 1 | 0 | 3 | 0 | 1 | 3 | 0 | 4 |
| | PM BEGIN PEAK HR | | | 4:30 PM | | | 1 | 0 | 1 | 0 | 2 | | | | | |

**AimTD LLC**

TURNING MOVEMENT COUNTS



# INTERSECTION TURNING MOVEMENT COUNTS

T218

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Aug 23, 22

LOCATION: Upland
NORTH & SOUTH: 13th
EAST & WEST: 15th

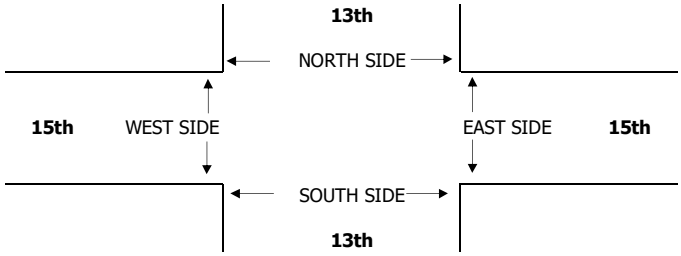
PROJECT #: SC3596
LOCATION #: 4
CONTROL: STOP N

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

☑ Add U-Turns to Left Turns

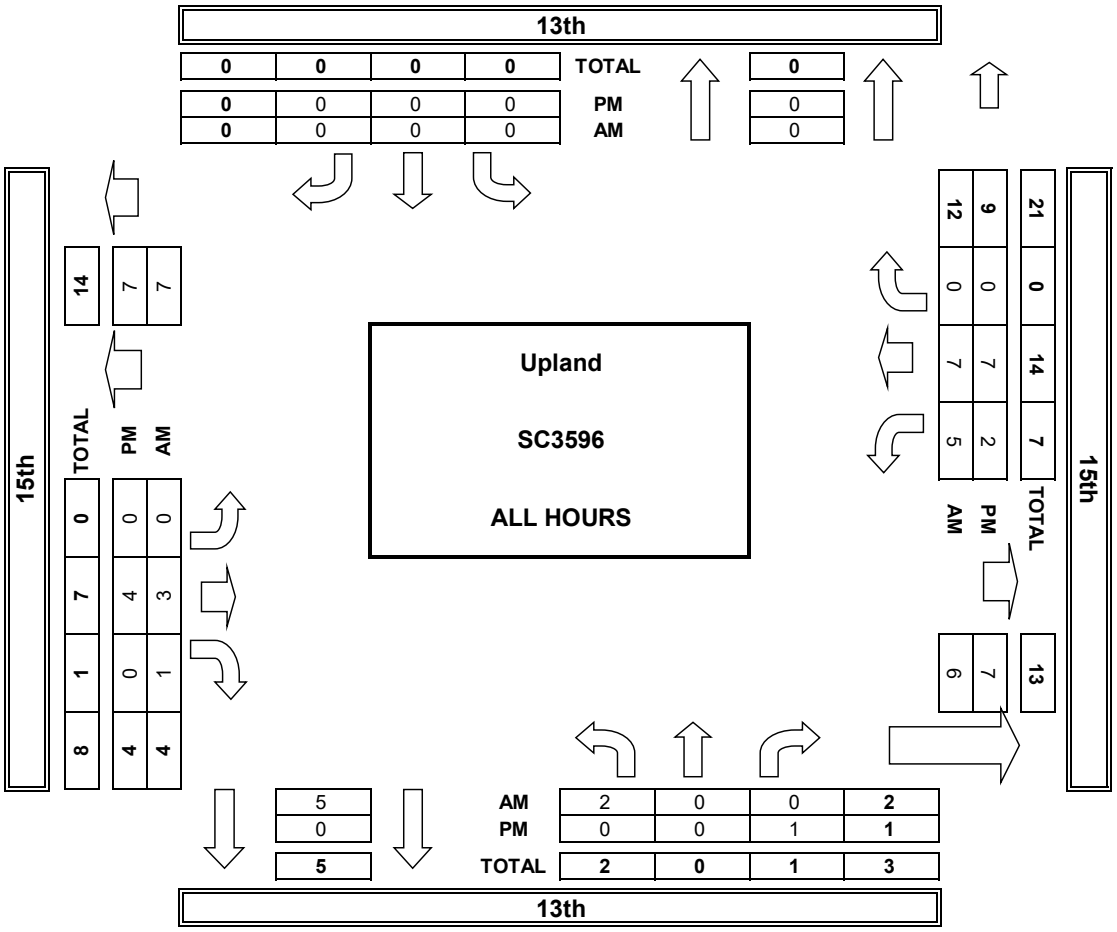
| | | NORTHBOUND 13th | | | SOUTHBOUND 13th | | | EASTBOUND 15th | | | WESTBOUND 15th | | | | U-TURNS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LANES: | NL 0 | NT X | NR 0 | SL X | ST X | SR X | EL X | ET 1 | ER 0 | WL 0 | WT 1 | WR X | TOTAL | NB 0 | SB 0 | EB 0 | WB 0 | TTL |
| AM | 7:00 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 |
| | 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 2 | 2 |
| | 7:45 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 2 |
| | 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 6 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 5 | 7 | 0 | 18 | 2 | 0 | 0 | 3 | 5 |
| | APPROACH % | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 75% | 25% | 42% | 58% | 0% | | | | | | |
| | APP/DEPART | 2 | / | 0 | 0 | / | 5 | 4 | / | 6 | 12 | / | 7 | 0 | | | | | |
| | BEGIN PEAK HR | | 7:00 AM | | | | | | | | | | | | | | | | |
| | VOLUMES | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 4 | 2 | 0 | 11 | | | | | |
| | APPROACH % | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 67% | 33% | 67% | 33% | 0% | | | | | | |
| | PEAK HR FACTOR | | 0.500 | | | 0.000 | | | 0.750 | | | 0.375 | | 0.688 | | | | | |
| | APP/DEPART | 2 | / | 0 | 0 | / | 4 | 3 | / | 5 | 6 | / | 2 | 0 | | | | | |
| PM | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| | 4:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 6 | 0 | 0 | 0 | 1 | 1 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | VOLUMES | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 7 | 0 | 14 | 0 | 0 | 0 | 2 | 2 |
| | APPROACH % | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% | 0% | 22% | 78% | 0% | | | | | | |
| | APP/DEPART | 1 | / | 0 | 0 | / | 0 | 4 | / | 7 | 9 | / | 7 | 0 | | | | | |
| | BEGIN PEAK HR | | 4:45 PM | | | | | | | | | | | | | | | | |
| | VOLUMES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 5 | 0 | 10 | | | | | |
| | APPROACH % | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% | 17% | 83% | 0% | | | | | | |
| | PEAK HR FACTOR | | 0.000 | | | 0.000 | | | 0.500 | | | 0.375 | | 0.417 | | | | | |
| | APP/DEPART | 0 | / | 0 | 0 | / | 0 | 4 | / | 5 | 6 | / | 5 | 0 | | | | | |

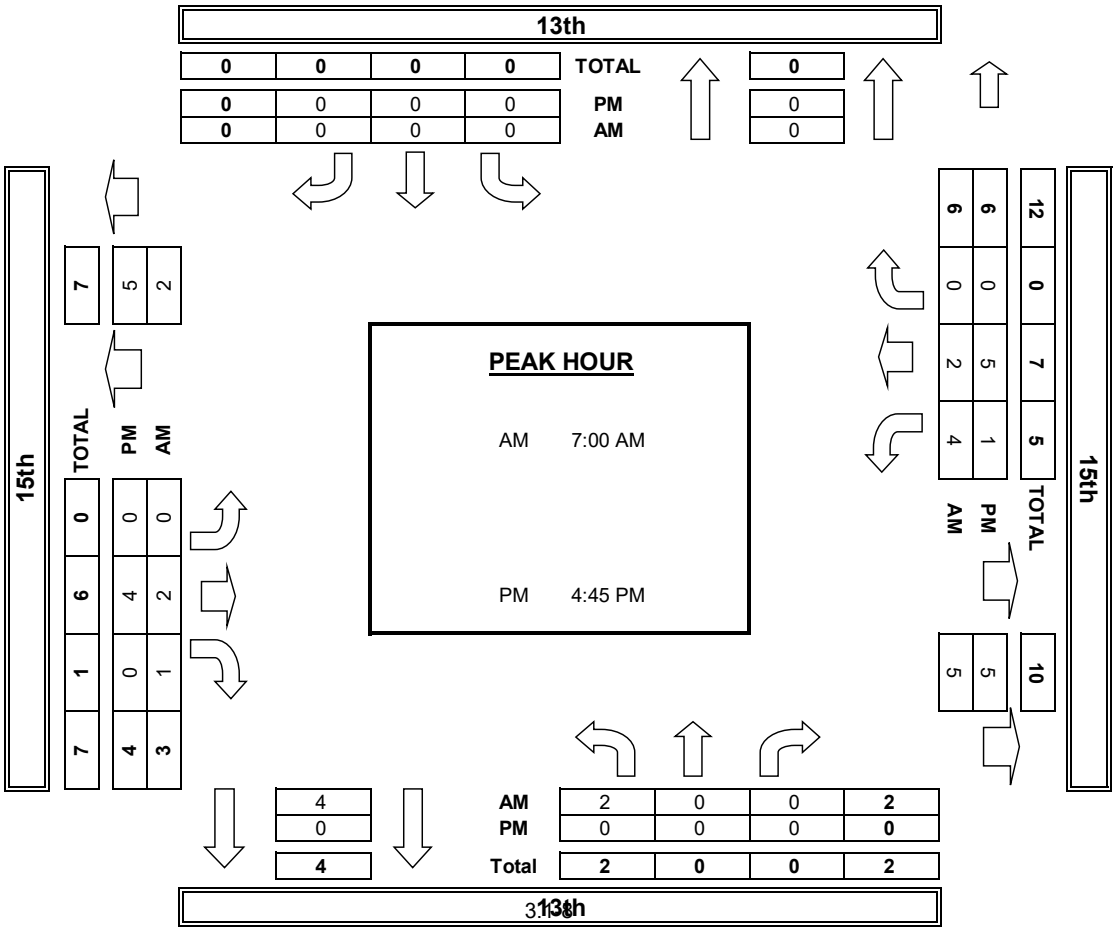



| | | PEDESTRIAN + BIKE CROSSINGS | | | | | PEDESTRIAN CROSSINGS | | | | | BICYCLE CROSSINGS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | N SIDE | S SIDE | E SIDE | W SIDE | TOTAL | NS | SS | ES | WS | TOTAL |
| AM | 7:00 AM | 0 | 3 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 7:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 7:30 AM | 0 | 5 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 2 |
| | 7:45 AM | 1 | 3 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 3 |
| | 8:00 AM | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| | 8:15 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 8:30 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 8:45 AM | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 4 | 14 | 0 | 1 | 19 | 0 | 9 | 0 | 1 | 10 | 4 | 5 | 0 | 0 | 9 |
| | AM BEGIN PEAK HR | | | 7:00 AM | | | 0 | 8 | 0 | 0 | 8 | | | | | |
| PM | 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5:30 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTAL | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | PM BEGIN PEAK HR | | | 4:45 PM | | | 0 | 0 | 0 | 0 | 0 | | | | | |

**AimTD LLC**

TURNING MOVEMENT COUNTS



Tuesday, August 23, 2022 CITY: Upland PROJECT: SC3596

**ADT1 Campus north of 15th.**

Suhsduhg#e|#Dlp WG#DOF#Whd#:47#586#;;;

| AM Period | NB | | SB | | | PM Period | NB | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0:00 | 12 | | 10 | | | 12:00 | 167 | | 156 | | |
| 0:15 | 16 | | 8 | | | 12:15 | 161 | | 136 | | |
| 0:30 | 8 | | 12 | | | 12:30 | 138 | | 151 | | |
| 0:45 | 13 | 49 | 6 | 36 | 85 | 12:45 | 170 | 636 | 175 | 618 | 1254 |
| 1:00 | 5 | | 7 | | | 13:00 | 158 | | 149 | | |
| 1:15 | 6 | | 11 | | | 13:15 | 137 | | 158 | | |
| 1:30 | 6 | | 4 | | | 13:30 | 142 | | 154 | | |
| 1:45 | 7 | 24 | 9 | 31 | 55 | 13:45 | 165 | 602 | 164 | 625 | 1227 |
| 2:00 | 6 | | 4 | | | 14:00 | 161 | | 169 | | |
| 2:15 | 6 | | 6 | | | 14:15 | 157 | | 198 | | |
| 2:30 | 9 | | 3 | | | 14:30 | 188 | | 186 | | |
| 2:45 | 7 | 28 | 4 | 17 | 45 | 14:45 | 207 | 713 | 171 | 724 | 1437 |
| 3:00 | 6 | | 7 | | | 15:00 | 171 | | 168 | | |
| 3:15 | 8 | | 3 | | | 15:15 | 209 | | 171 | | |
| 3:30 | 8 | | 7 | | | 15:30 | 166 | | 166 | | |
| 3:45 | 13 | 35 | 5 | 22 | 57 | 15:45 | 197 | 743 | 187 | 692 | 1435 |
| 4:00 | 11 | | 7 | | | 16:00 | 219 | | 149 | | |
| 4:15 | 18 | | 9 | | | 16:15 | 212 | | 176 | | |
| 4:30 | 17 | | 13 | | | 16:30 | 212 | | 164 | | |
| 4:45 | 23 | 69 | 16 | 45 | 114 | 16:45 | 225 | 868 | 181 | 670 | 1538 |
| 5:00 | 36 | | 21 | | | 17:00 | 248 | | 148 | | |
| 5:15 | 40 | | 18 | | | 17:15 | 256 | | 162 | | |
| 5:30 | 43 | | 24 | | | 17:30 | 234 | | 155 | | |
| 5:45 | 43 | 162 | 42 | 105 | 267 | 17:45 | 201 | 939 | 153 | 618 | 1557 |
| 6:00 | 55 | | 44 | | | 18:00 | 172 | | 156 | | |
| 6:15 | 49 | | 55 | | | 18:15 | 194 | | 168 | | |
| 6:30 | 71 | | 62 | | | 18:30 | 151 | | 127 | | |
| 6:45 | 104 | 279 | 116 | 277 | 556 | 18:45 | 148 | 665 | 134 | 585 | 1250 |
| 7:00 | 105 | | 134 | | | 19:00 | 136 | | 142 | | |
| 7:15 | 132 | | 159 | | | 19:15 | 138 | | 137 | | |
| 7:30 | 174 | | 220 | | | 19:30 | 141 | | 126 | | |
| 7:45 | 208 | 619 | 187 | 700 | 1319 | 19:45 | 119 | 534 | 113 | 518 | 1052 |
| 8:00 | 187 | | 173 | | | 20:00 | 127 | | 120 | | |
| 8:15 | 165 | | 163 | | | 20:15 | 101 | | 101 | | |
| 8:30 | 153 | | 158 | | | 20:30 | 90 | | 82 | | |
| 8:45 | 121 | 626 | 153 | 647 | 1273 | 20:45 | 77 | 395 | 93 | 396 | 791 |
| 9:00 | 117 | | 139 | | | 21:00 | 71 | | 88 | | |
| 9:15 | 125 | | 111 | | | 21:15 | 51 | | 86 | | |
| 9:30 | 135 | | 122 | | | 21:30 | 45 | | 58 | | |
| 9:45 | 107 | 484 | 143 | 515 | 999 | 21:45 | 64 | 231 | 63 | 295 | 526 |
| 10:00 | 130 | | 146 | | | 22:00 | 45 | | 54 | | |
| 10:15 | 114 | | 136 | | | 22:15 | 32 | | 37 | | |
| 10:30 | 121 | | 145 | | | 22:30 | 34 | | 47 | | |
| 10:45 | 122 | 487 | 150 | 577 | 1064 | 22:45 | 26 | 137 | 39 | 177 | 314 |
| 11:00 | 131 | | 129 | | | 23:00 | 28 | | 28 | | |
| 11:15 | 120 | | 135 | | | 23:15 | 25 | | 27 | | |
| 11:30 | 142 | | 169 | | | 23:30 | 19 | | 20 | | |
| 11:45 | 179 | 572 | 145 | 578 | 1150 | 23:45 | 12 | 84 | 28 | 103 | 187 |
| **Total Vol.** | 3434 | | 3550 | | **6984** | | 6547 | | 6021 | | **12568** |

**Daily Totals**

| NB | SB | Combined |
|---|---|---|
| 9981 | 9571 | **19552** |

| | AM | | | PM | | |
|---|---|---|---|---|---|---|
| **Split %** | 49.2% | 50.8% | **35.7%** | 52.1% | 47.9% | **64.3%** |
| **Peak Hour** | 7:30 | 7:30 | **7:30** | 16:45 | 14:00 | **16:45** |
| **Volume** | 734 | 743 | **1477** | 963 | 724 | **1609** |
| **P.H.F.** | 0.88 | 0.84 | **0.93** | 0.96 | 0.91 | **0.96** |

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Tuesday, August 23, 2022 CITY: Upland PROJECT: SC3596

**ADT2 15th east of Campus.**

Suhsduhg#e|#Dlp WG#DOF#Whd#:47#586#;;;

| AM Period | EB | | WB | | | PM Period | EB | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0:00 | 1 | | 0 | | | 12:00 | 3 | | 2 | | |
| 0:15 | 0 | | 0 | | | 12:15 | 5 | | 3 | | |
| 0:30 | 0 | | 0 | | | 12:30 | 6 | | 5 | | |
| 0:45 | 0 | 1 | 0 | 0 | 1 | 12:45 | 6 | 20 | 5 | 15 | 35 |
| 1:00 | 0 | | 1 | | | 13:00 | 7 | | 5 | | |
| 1:15 | 1 | | 0 | | | 13:15 | 2 | | 4 | | |
| 1:30 | 0 | | 0 | | | 13:30 | 6 | | 5 | | |
| 1:45 | 1 | 2 | 1 | 2 | 4 | 13:45 | 5 | 20 | 3 | 17 | 37 |
| 2:00 | 0 | | 0 | | | 14:00 | 5 | | 5 | | |
| 2:15 | 1 | | 0 | | | 14:15 | 3 | | 7 | | |
| 2:30 | 0 | | 0 | | | 14:30 | 9 | | 3 | | |
| 2:45 | 0 | 1 | 0 | 0 | 1 | 14:45 | 4 | 21 | 5 | 20 | 41 |
| 3:00 | 0 | | 0 | | | 15:00 | 5 | | 5 | | |
| 3:15 | 0 | | 0 | | | 15:15 | 2 | | 3 | | |
| 3:30 | 0 | | 1 | | | 15:30 | 6 | | 5 | | |
| 3:45 | 1 | 1 | 1 | 2 | 3 | 15:45 | 8 | 21 | 1 | 14 | 35 |
| 4:00 | 2 | | 1 | | | 16:00 | 8 | | 4 | | |
| 4:15 | 0 | | 0 | | | 16:15 | 3 | | 4 | | |
| 4:30 | 0 | | 1 | | | 16:30 | 7 | | 2 | | |
| 4:45 | 0 | 2 | 1 | 3 | 5 | 16:45 | 0 | 18 | 2 | 12 | 30 |
| 5:00 | 0 | | 3 | | | 17:00 | 8 | | 1 | | |
| 5:15 | 0 | | 3 | | | 17:15 | 2 | | 1 | | |
| 5:30 | 0 | | 1 | | | 17:30 | 6 | | 1 | | |
| 5:45 | 1 | 1 | 0 | 7 | 8 | 17:45 | 6 | 22 | 7 | 10 | 32 |
| 6:00 | 0 | | 3 | | | 18:00 | 2 | | 5 | | |
| 6:15 | 1 | | 1 | | | 18:15 | 3 | | 2 | | |
| 6:30 | 0 | | 4 | | | 18:30 | 1 | | 3 | | |
| 6:45 | 3 | 4 | 5 | 13 | 17 | 18:45 | 6 | 12 | 5 | 15 | 27 |
| 7:00 | 4 | | 3 | | | 19:00 | 3 | | 2 | | |
| 7:15 | 2 | | 9 | | | 19:15 | 6 | | 2 | | |
| 7:30 | 3 | | 15 | | | 19:30 | 1 | | 1 | | |
| 7:45 | 7 | 16 | 8 | 35 | 51 | 19:45 | 5 | 15 | 1 | 6 | 21 |
| 8:00 | 6 | | 7 | | | 20:00 | 9 | | 4 | | |
| 8:15 | 3 | | 5 | | | 20:15 | 5 | | 5 | | |
| 8:30 | 6 | | 7 | | | 20:30 | 2 | | 7 | | |
| 8:45 | 6 | 21 | 2 | 21 | 42 | 20:45 | 2 | 18 | 4 | 20 | 38 |
| 9:00 | 3 | | 3 | | | 21:00 | 2 | | 1 | | |
| 9:15 | 0 | | 2 | | | 21:15 | 3 | | 2 | | |
| 9:30 | 4 | | 4 | | | 21:30 | 2 | | 0 | | |
| 9:45 | 2 | 9 | 3 | 12 | 21 | 21:45 | 3 | 10 | 2 | 5 | 15 |
| 10:00 | 3 | | 3 | | | 22:00 | 4 | | 2 | | |
| 10:15 | 1 | | 2 | | | 22:15 | 0 | | 0 | | |
| 10:30 | 5 | | 5 | | | 22:30 | 1 | | 0 | | |
| 10:45 | 7 | 16 | 8 | 18 | 34 | 22:45 | 1 | 6 | 1 | 3 | 9 |
| 11:00 | 3 | | 3 | | | 23:00 | 1 | | 0 | | |
| 11:15 | 2 | | 2 | | | 23:15 | 0 | | 0 | | |
| 11:30 | 0 | | 5 | | | 23:30 | 2 | | 1 | | |
| 11:45 | 4 | 9 | 6 | 16 | 25 | 23:45 | 2 | 5 | 0 | 1 | 6 |
| **Total Vol.** | | 83 | | 129 | **212** | | | 188 | | 138 | **326** |

| **Daily Totals** | EB | WB | **Combined** |
|---|---|---|---|
| | 271 | 267 | **538** |

| | **AM** | | | **PM** | | |
|---|---|---|---|---|---|---|
| **Split %** | 39.2% | 60.8% | **39.4%** | 57.7% | 42.3% | **60.6%** |
| **Peak Hour** | 7:45 | 7:15 | **7:15** | 15:45 | 13:30 | **12:15** |
| **Volume** | 22 | 39 | **57** | 26 | 20 | **42** |
| **P.H.F.** | 0.79 | 0.65 | **0.79** | 0.81 | 0.71 | **0.88** |

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Tuesday, August 23, 2022 CITY: Upland PROJECT: SC3596

**ADT3 15th west of 13th.**

Suhsduhg#e|#Dlp WG#DOF#Whd#:47#586#;;;

| AM Period | EB | | WB | | | PM Period | EB | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0:00 | 0 | | 0 | | | 12:00 | 0 | | 2 | | |
| 0:15 | 0 | | 0 | | | 12:15 | 0 | | 0 | | |
| 0:30 | 0 | | 1 | | | 12:30 | 1 | | 3 | | |
| 0:45 | 0 | 0 | 0 | 1 | 1 | 12:45 | 2 | 3 | 2 | 7 | 10 |
| 1:00 | 0 | | 0 | | | 13:00 | 0 | | 0 | | |
| 1:15 | 0 | | 0 | | | 13:15 | 0 | | 1 | | |
| 1:30 | 0 | | 0 | | | 13:30 | 1 | | 3 | | |
| 1:45 | 0 | 0 | 0 | 0 | | 13:45 | 0 | 1 | 1 | 5 | 6 |
| 2:00 | 0 | | 0 | | | 14:00 | 0 | | 2 | | |
| 2:15 | 0 | | 0 | | | 14:15 | 2 | | 3 | | |
| 2:30 | 0 | | 0 | | | 14:30 | 0 | | 1 | | |
| 2:45 | 0 | 0 | 0 | 0 | | 14:45 | 1 | 3 | 3 | 9 | 12 |
| 3:00 | 0 | | 0 | | | 15:00 | 1 | | 0 | | |
| 3:15 | 0 | | 0 | | | 15:15 | 0 | | 0 | | |
| 3:30 | 0 | | 0 | | | 15:30 | 1 | | 2 | | |
| 3:45 | 0 | 0 | 0 | 0 | | 15:45 | 2 | 4 | 2 | 4 | 8 |
| 4:00 | 0 | | 0 | | | 16:00 | 0 | | 1 | | |
| 4:15 | 0 | | 0 | | | 16:15 | 0 | | 0 | | |
| 4:30 | 0 | | 0 | | | 16:30 | 0 | | 1 | | |
| 4:45 | 0 | 0 | 0 | 0 | | 16:45 | 1 | 1 | 0 | 2 | 3 |
| 5:00 | 0 | | 0 | | | 17:00 | 1 | | 2 | | |
| 5:15 | 0 | | 0 | | | 17:15 | 0 | | 0 | | |
| 5:30 | 0 | | 0 | | | 17:30 | 2 | | 3 | | |
| 5:45 | 0 | 0 | 0 | 0 | | 17:45 | 0 | 3 | 0 | 5 | 8 |
| 6:00 | 0 | | 0 | | | 18:00 | 2 | | 0 | | |
| 6:15 | 0 | | 0 | | | 18:15 | 2 | | 2 | | |
| 6:30 | 1 | | 0 | | | 18:30 | 0 | | 0 | | |
| 6:45 | 0 | 1 | 0 | 0 | 1 | 18:45 | 0 | 4 | 0 | 2 | 6 |
| 7:00 | 1 | | 0 | | | 19:00 | 0 | | 0 | | |
| 7:15 | 1 | | 0 | | | 19:15 | 0 | | 0 | | |
| 7:30 | 0 | | 2 | | | 19:30 | 0 | | 1 | | |
| 7:45 | 1 | 3 | 0 | 2 | 5 | 19:45 | 0 | 0 | 1 | 2 | 2 |
| 8:00 | 0 | | 0 | | | 20:00 | 1 | | 0 | | |
| 8:15 | 0 | | 0 | | | 20:15 | 0 | | 0 | | |
| 8:30 | 1 | | 0 | | | 20:30 | 0 | | 1 | | |
| 8:45 | 0 | 1 | 5 | 5 | 6 | 20:45 | 0 | 1 | 0 | 1 | 2 |
| 9:00 | 0 | | 1 | | | 21:00 | 0 | | 0 | | |
| 9:15 | 1 | | 1 | | | 21:15 | 0 | | 0 | | |
| 9:30 | 0 | | 0 | | | 21:30 | 0 | | 0 | | |
| 9:45 | 0 | 1 | 0 | 2 | 3 | 21:45 | 0 | 0 | 0 | 0 | |
| 10:00 | 0 | | 0 | | | 22:00 | 0 | | 0 | | |
| 10:15 | 0 | | 5 | | | 22:15 | 0 | | 2 | | |
| 10:30 | 1 | | 0 | | | 22:30 | 0 | | 0 | | |
| 10:45 | 1 | 2 | 2 | 7 | 9 | 22:45 | 0 | 0 | 1 | 3 | 3 |
| 11:00 | 0 | | 1 | | | 23:00 | 0 | | 0 | | |
| 11:15 | 0 | | 0 | | | 23:15 | 0 | | 0 | | |
| 11:30 | 0 | | 1 | | | 23:30 | 0 | | 0 | | |
| 11:45 | 0 | 0 | 0 | 2 | 2 | 23:45 | 0 | 0 | 0 | 0 | |
| **Total Vol.** | | 8 | | 19 | **27** | | | 20 | | 40 | **60** |

| **Daily Totals** | | |
|---|---|---|
| EB | WB | **Combined** |
| 28 | 59 | **87** |

| | **AM** | | | **PM** | | |
|---|---|---|---|---|---|---|
| **Split %** | 29.6% | 70.4% | **31.0%** | 33.3% | 66.7% | **69.0%** |
| **Peak Hour** | 6:30 | 10:15 | **10:15** | 17:30 | 13:30 | **13:30** |
| **Volume** | 3 | 8 | **10** | 6 | 9 | **12** |
| **P.H.F.** | 0.75 | 0.40 | **0.50** | 0.75 | 0.75 | **0.60** |

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# APPENDIX 3.2: EXISTING (2022) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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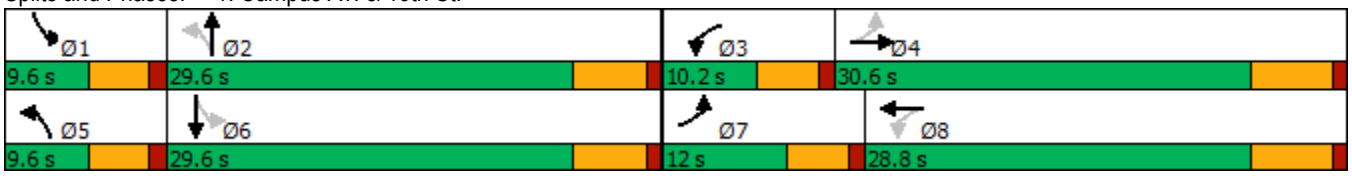
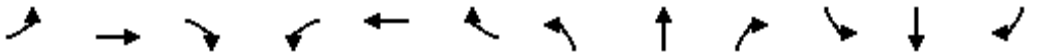
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 160 | 318 | 166 | 533 | 73 | 546 | 51 | 512 |
| Future Volume (vph) | 160 | 318 | 166 | 533 | 73 | 546 | 51 | 512 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 12.0 | 30.6 | 10.2 | 28.8 | 9.6 | 29.6 | 9.6 | 29.6 |
| Total Split (%) | 15.0% | 38.3% | 12.8% | 36.0% | 12.0% | 37.0% | 12.0% | 37.0% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 69.8 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 16th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 160 | 318 | 56 | 166 | 533 | 42 | 73 | 546 | 116 | 51 | 512 | 198 |
| Future Volume (veh/h) | 160 | 318 | 56 | 166 | 533 | 42 | 73 | 546 | 116 | 51 | 512 | 198 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.98 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 174 | 346 | 61 | 180 | 579 | 46 | 79 | 593 | 126 | 55 | 557 | 215 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 325 | 744 | 130 | 379 | 750 | 59 | 246 | 831 | 176 | 256 | 690 | 266 |
| Arrive On Green | 0.11 | 0.26 | 0.26 | 0.08 | 0.24 | 0.24 | 0.06 | 0.30 | 0.30 | 0.05 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1594 | 2864 | 500 | 1594 | 3156 | 250 | 1594 | 2755 | 584 | 1594 | 2363 | 909 |
| Grp Volume(v), veh/h | 174 | 202 | 205 | 180 | 308 | 317 | 79 | 362 | 357 | 55 | 396 | 376 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1681 | 1594 | 1683 | 1723 | 1594 | 1683 | 1656 | 1594 | 1683 | 1589 |
| Q Serve(g_s), s | 5.4 | 6.7 | 6.9 | 5.6 | 11.4 | 11.4 | 2.3 | 12.7 | 12.8 | 1.6 | 14.5 | 14.6 |
| Cycle Q Clear(g_c), s | 5.4 | 6.7 | 6.9 | 5.6 | 11.4 | 11.4 | 2.3 | 12.7 | 12.8 | 1.6 | 14.5 | 14.6 |
| Prop In Lane | 1.00 | | 0.30 | 1.00 | | 0.15 | 1.00 | | 0.35 | 1.00 | | 0.57 |
| Lane Grp Cap(c), veh/h | 325 | 437 | 436 | 379 | 400 | 410 | 246 | 508 | 500 | 256 | 492 | 464 |
| V/C Ratio(X) | 0.54 | 0.46 | 0.47 | 0.47 | 0.77 | 0.77 | 0.32 | 0.71 | 0.72 | 0.21 | 0.81 | 0.81 |
| Avail Cap(c_a), veh/h | 333 | 627 | 626 | 379 | 582 | 595 | 273 | 612 | 602 | 300 | 612 | 578 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 17.4 | 20.7 | 20.8 | 17.6 | 23.7 | 23.7 | 16.6 | 20.7 | 20.7 | 16.2 | 21.8 | 21.8 |
| Incr Delay (d2), s/veh | 0.8 | 0.8 | 0.8 | 0.3 | 3.8 | 3.8 | 0.3 | 3.1 | 3.2 | 0.2 | 6.4 | 6.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.7 | 2.4 | 2.5 | 1.8 | 4.4 | 4.5 | 0.7 | 4.8 | 4.8 | 0.5 | 5.9 | 5.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 18.2 | 21.5 | 21.6 | 18.0 | 27.5 | 27.5 | 16.9 | 23.7 | 23.9 | 16.4 | 28.2 | 28.8 |
| LnGrp LOS | B | C | C | B | C | C | B | C | C | B | C | C |
| Approach Vol, veh/h | | 581 | | | 805 | | | 798 | | | 827 | |
| Approach Delay, s/veh | | 20.5 | | | 25.4 | | | 23.1 | | | 27.7 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.8 | 25.5 | 10.2 | 23.1 | 8.4 | 24.8 | 11.7 | 21.6 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 5.0 | 24.2 | 5.6 | 24.8 | 5.0 | 24.2 | 7.4 | 23.0 |
| Max Q Clear Time (g_c+I1), s | 3.6 | 14.8 | 7.6 | 8.9 | 4.3 | 16.6 | 7.4 | 13.4 |
| Green Ext Time (p_c), s | 0.0 | 2.9 | 0.0 | 1.9 | 0.0 | 2.8 | 0.0 | 2.4 |

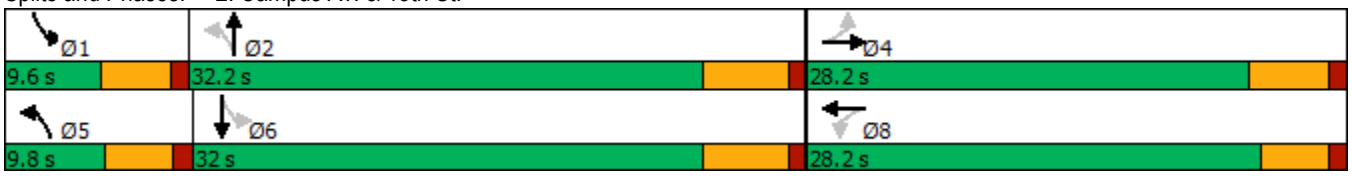
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 24.5 |
| HCM 6th LOS | C |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 43 | 7 | 10 | 14 | 48 | 680 | 6 | 706 |
| Future Volume (vph) | 43 | 7 | 10 | 14 | 48 | 680 | 6 | 706 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 9.8 | 32.2 | 9.6 | 32.0 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 14.0% | 46.0% | 13.7% | 45.7% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 40.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 43 | 7 | 74 | 10 | 14 | 11 | 48 | 680 | 6 | 6 | 706 | 31 |
| Future Volume (veh/h) | 43 | 7 | 74 | 10 | 14 | 11 | 48 | 680 | 6 | 6 | 706 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 47 | 8 | 81 | 11 | 15 | 12 | 53 | 747 | 7 | 7 | 776 | 34 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 415 | 28 | 279 | 359 | 183 | 146 | 367 | 1388 | 13 | 348 | 1182 | 52 |
| Arrive On Green | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.06 | 0.41 | 0.41 | 0.01 | 0.36 | 0.36 |
| Sat Flow, veh/h | 1238 | 136 | 1381 | 1166 | 905 | 724 | 1594 | 3417 | 32 | 1594 | 3285 | 144 |
| Grp Volume(v), veh/h | 47 | 0 | 89 | 11 | 0 | 27 | 53 | 368 | 386 | 7 | 398 | 412 |
| Grp Sat Flow(s),veh/h/ln | 1238 | 0 | 1517 | 1166 | 0 | 1630 | 1594 | 1683 | 1766 | 1594 | 1683 | 1746 |
| Q Serve(g_s), s | 1.3 | 0.0 | 2.0 | 0.3 | 0.0 | 0.5 | 0.8 | 6.6 | 6.6 | 0.1 | 7.9 | 7.9 |
| Cycle Q Clear(g_c), s | 1.8 | 0.0 | 2.0 | 2.3 | 0.0 | 0.5 | 0.8 | 6.6 | 6.6 | 0.1 | 7.9 | 7.9 |
| Prop In Lane | 1.00 | | 0.91 | 1.00 | | 0.44 | 1.00 | | 0.02 | 1.00 | | 0.08 |
| Lane Grp Cap(c), veh/h | 415 | 0 | 307 | 359 | 0 | 329 | 367 | 684 | 717 | 348 | 606 | 628 |
| V/C Ratio(X) | 0.11 | 0.00 | 0.29 | 0.03 | 0.00 | 0.08 | 0.14 | 0.54 | 0.54 | 0.02 | 0.66 | 0.66 |
| Avail Cap(c_a), veh/h | 881 | 0 | 878 | 816 | 0 | 968 | 487 | 1135 | 1191 | 534 | 1127 | 1169 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.6 | 0.0 | 13.4 | 14.4 | 0.0 | 12.9 | 7.9 | 9.0 | 9.0 | 8.2 | 10.7 | 10.7 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 | 0.7 | 0.6 | 0.0 | 1.2 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.0 | 0.6 | 0.1 | 0.0 | 0.2 | 0.2 | 1.6 | 1.7 | 0.0 | 2.1 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.7 | 0.0 | 14.0 | 14.4 | 0.0 | 13.0 | 7.9 | 9.6 | 9.6 | 8.2 | 11.9 | 11.8 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | A | B | B |
| Approach Vol, veh/h | | 136 | | | 38 | | | 807 | | | 817 | |
| Approach Delay, s/veh | | 13.9 | | | 13.4 | | | 9.5 | | | 11.8 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 21.5 | | 13.2 | 6.8 | 19.7 | | 13.2 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.2 | 26.6 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 8.6 | | 4.0 | 2.8 | 9.9 | | 4.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.1 | | 0.5 | 0.0 | 4.4 | | 0.1 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 11.0 |
| HCM 6th LOS | | B |

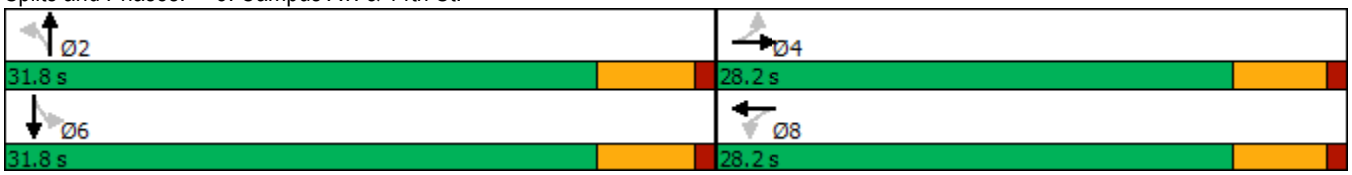
Notes

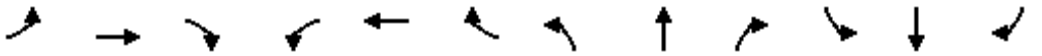
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 34 | 49 | 32 | 108 | 34 | 493 | 146 | 588 |
| Future Volume (vph) | 34 | 49 | 32 | 108 | 34 | 493 | 146 | 588 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 41.1 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 34 | 49 | 27 | 32 | 108 | 201 | 34 | 493 | 40 | 146 | 588 | 51 |
| Future Volume (veh/h) | 34 | 49 | 27 | 32 | 108 | 201 | 34 | 493 | 40 | 146 | 588 | 51 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 38 | 54 | 24 | 36 | 120 | 190 | 38 | 548 | 40 | 162 | 653 | 55 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 272 | 313 | 139 | 461 | 165 | 262 | 394 | 1459 | 106 | 440 | 1439 | 121 |
| Arrive On Green | 0.27 | 0.27 | 0.27 | 0.27 | 0.27 | 0.27 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 |
| Sat Flow, veh/h | 957 | 1161 | 516 | 1180 | 612 | 969 | 662 | 3181 | 232 | 740 | 3136 | 264 |
| Grp Volume(v), veh/h | 38 | 0 | 78 | 36 | 0 | 310 | 38 | 290 | 298 | 162 | 350 | 358 |
| Grp Sat Flow(s),veh/h/ln | 957 | 0 | 1678 | 1180 | 0 | 1582 | 662 | 1683 | 1729 | 740 | 1683 | 1717 |
| Q Serve(g_s), s | 1.5 | 0.0 | 1.4 | 0.9 | 0.0 | 7.0 | 1.6 | 4.4 | 4.4 | 7.2 | 5.6 | 5.6 |
| Cycle Q Clear(g_c), s | 8.4 | 0.0 | 1.4 | 2.3 | 0.0 | 7.0 | 7.2 | 4.4 | 4.4 | 11.6 | 5.6 | 5.6 |
| Prop In Lane | 1.00 | | 0.31 | 1.00 | | 0.61 | 1.00 | | 0.13 | 1.00 | | 0.15 |
| Lane Grp Cap(c), veh/h | 272 | 0 | 453 | 461 | 0 | 427 | 394 | 772 | 793 | 440 | 772 | 788 |
| V/C Ratio(X) | 0.14 | 0.00 | 0.17 | 0.08 | 0.00 | 0.73 | 0.10 | 0.37 | 0.38 | 0.37 | 0.45 | 0.45 |
| Avail Cap(c_a), veh/h | 577 | 0 | 987 | 837 | 0 | 931 | 537 | 1137 | 1168 | 600 | 1137 | 1160 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.8 | 0.0 | 10.9 | 11.8 | 0.0 | 13.0 | 9.7 | 6.9 | 6.9 | 10.7 | 7.2 | 7.2 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 0.2 | 0.1 | 0.0 | 2.4 | 0.1 | 0.3 | 0.3 | 0.5 | 0.4 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 0.0 | 0.4 | 0.2 | 0.0 | 2.3 | 0.2 | 1.0 | 1.0 | 0.8 | 1.2 | 1.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.0 | 0.0 | 11.1 | 11.9 | 0.0 | 15.3 | 9.8 | 7.2 | 7.2 | 11.2 | 7.6 | 7.6 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 116 | | | 346 | | | 626 | | | 870 | |
| Approach Delay, s/veh | | 13.0 | | | 15.0 | | | 7.4 | | | 8.3 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 23.3 | | 15.7 | | 23.3 | | 15.7 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 9.2 | | 10.4 | | 13.6 | | 9.0 | | | | |
| Green Ext Time (p_c), s | | 3.4 | | 0.4 | | 4.3 | | 1.8 | | | | |

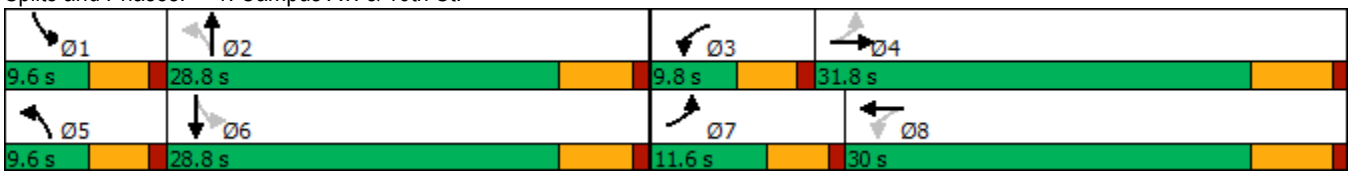
| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 9.5 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 190 | 944 | 99 | 326 | 68 | 627 | 134 | 453 |
| Future Volume (vph) | 190 | 944 | 99 | 326 | 68 | 627 | 134 | 453 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 11.6 | 31.8 | 9.8 | 30.0 | 9.6 | 28.8 | 9.6 | 28.8 |
| Total Split (%) | 14.5% | 39.8% | 12.3% | 37.5% | 12.0% | 36.0% | 12.0% | 36.0% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 80
Actuated Cycle Length: 77.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Campus Av. & 16th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 190 | 944 | 82 | 99 | 326 | 71 | 68 | 627 | 274 | 134 | 453 | 171 |
| Future Volume (veh/h) | 190 | 944 | 82 | 99 | 326 | 71 | 68 | 627 | 274 | 134 | 453 | 171 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 194 | 963 | 84 | 101 | 333 | 72 | 69 | 640 | 280 | 137 | 462 | 174 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 407 | 1020 | 89 | 200 | 826 | 176 | 268 | 666 | 291 | 199 | 735 | 274 |
| Arrive On Green | 0.09 | 0.33 | 0.33 | 0.06 | 0.30 | 0.30 | 0.05 | 0.29 | 0.29 | 0.06 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1594 | 3129 | 273 | 1594 | 2760 | 589 | 1594 | 2267 | 991 | 1594 | 2388 | 892 |
| Grp Volume(v), veh/h | 194 | 518 | 529 | 101 | 201 | 204 | 69 | 475 | 445 | 137 | 324 | 312 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1718 | 1594 | 1683 | 1666 | 1594 | 1683 | 1575 | 1594 | 1683 | 1597 |
| Q Serve(g_s), s | 6.8 | 23.9 | 23.9 | 3.4 | 7.6 | 7.8 | 2.4 | 22.1 | 22.1 | 4.8 | 13.2 | 13.4 |
| Cycle Q Clear(g_c), s | 6.8 | 23.9 | 23.9 | 3.4 | 7.6 | 7.8 | 2.4 | 22.1 | 22.1 | 4.8 | 13.2 | 13.4 |
| Prop In Lane | 1.00 | | 0.16 | 1.00 | | 0.35 | 1.00 | | 0.63 | 1.00 | | 0.56 |
| Lane Grp Cap(c), veh/h | 407 | 549 | 560 | 200 | 504 | 498 | 268 | 495 | 463 | 199 | 518 | 491 |
| V/C Ratio(X) | 0.48 | 0.94 | 0.94 | 0.50 | 0.40 | 0.41 | 0.26 | 0.96 | 0.96 | 0.69 | 0.63 | 0.63 |
| Avail Cap(c_a), veh/h | 407 | 550 | 561 | 207 | 512 | 506 | 290 | 495 | 463 | 199 | 518 | 491 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 17.5 | 26.1 | 26.1 | 20.8 | 22.2 | 22.3 | 19.0 | 27.7 | 27.7 | 21.4 | 23.6 | 23.7 |
| Incr Delay (d2), s/veh | 0.3 | 25.2 | 24.9 | 0.7 | 0.5 | 0.5 | 0.2 | 30.6 | 31.9 | 8.0 | 2.4 | 2.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.2 | 12.3 | 12.5 | 1.2 | 2.8 | 2.8 | 0.8 | 12.3 | 11.7 | 2.1 | 5.2 | 5.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.8 | 51.3 | 51.0 | 21.6 | 22.7 | 22.8 | 19.2 | 58.2 | 59.6 | 29.4 | 26.0 | 26.4 |
| LnGrp LOS | B | D | D | C | C | C | B | E | E | C | C | C |
| Approach Vol, veh/h | | 1241 | | | 506 | | | 989 | | | 773 | |
| Approach Delay, s/veh | | 46.0 | | | 22.5 | | | 56.1 | | | 26.8 | |
| Approach LOS | | D | | | C | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 28.8 | 9.5 | 31.8 | 8.5 | 29.9 | 11.6 | 29.6 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 5.0 | 23.4 | 5.2 | 26.0 | 5.0 | 23.4 | 7.0 | 24.2 |
| Max Q Clear Time (g_c+I1), s | 6.8 | 24.1 | 5.4 | 25.9 | 4.4 | 15.4 | 8.8 | 9.8 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 2.3 | 0.0 | 1.8 |

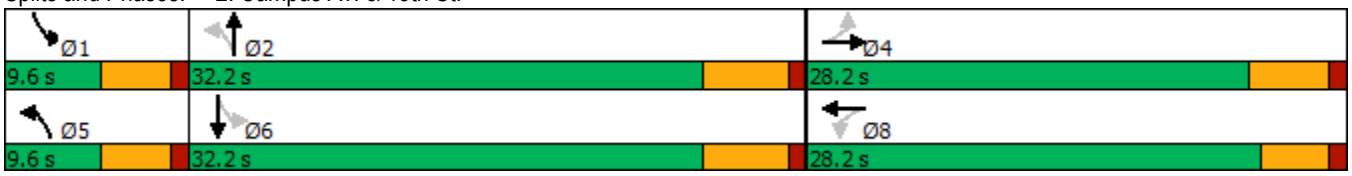
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 41.2 |
| HCM 6th LOS | D |

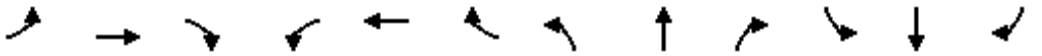
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 121 | 6 | 1 | 0 | 25 | 838 | 6 | 609 |
| Future Volume (vph) | 121 | 6 | 1 | 0 | 25 | 838 | 6 | 609 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 9.6 | 32.2 | 9.6 | 32.2 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 13.7% | 46.0% | 13.7% | 46.0% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 39.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 121 | 6 | 43 | 1 | 0 | 4 | 25 | 838 | 4 | 6 | 609 | 31 |
| Future Volume (veh/h) | 121 | 6 | 43 | 1 | 0 | 4 | 25 | 838 | 4 | 6 | 609 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 126 | 6 | 45 | 1 | 0 | 4 | 26 | 873 | 4 | 6 | 634 | 32 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 461 | 39 | 295 | 418 | 0 | 333 | 375 | 1316 | 6 | 294 | 1173 | 59 |
| Arrive On Green | 0.22 | 0.22 | 0.22 | 0.22 | 0.00 | 0.22 | 0.03 | 0.38 | 0.38 | 0.01 | 0.36 | 0.36 |
| Sat Flow, veh/h | 1264 | 177 | 1329 | 1208 | 0 | 1502 | 1594 | 3437 | 16 | 1594 | 3261 | 164 |
| Grp Volume(v), veh/h | 126 | 0 | 51 | 1 | 0 | 4 | 26 | 428 | 449 | 6 | 327 | 339 |
| Grp Sat Flow(s),veh/h/ln | 1264 | 0 | 1506 | 1208 | 0 | 1502 | 1594 | 1683 | 1769 | 1594 | 1683 | 1742 |
| Q Serve(g_s), s | 3.4 | 0.0 | 1.1 | 0.0 | 0.0 | 0.1 | 0.4 | 8.2 | 8.2 | 0.1 | 6.1 | 6.1 |
| Cycle Q Clear(g_c), s | 3.5 | 0.0 | 1.1 | 1.1 | 0.0 | 0.1 | 0.4 | 8.2 | 8.2 | 0.1 | 6.1 | 6.1 |
| Prop In Lane | 1.00 | | 0.88 | 1.00 | | 1.00 | 1.00 | | 0.01 | 1.00 | | 0.09 |
| Lane Grp Cap(c), veh/h | 461 | 0 | 334 | 418 | 0 | 333 | 375 | 645 | 677 | 294 | 605 | 627 |
| V/C Ratio(X) | 0.27 | 0.00 | 0.15 | 0.00 | 0.00 | 0.01 | 0.07 | 0.66 | 0.66 | 0.02 | 0.54 | 0.54 |
| Avail Cap(c_a), veh/h | 921 | 0 | 882 | 877 | 0 | 903 | 528 | 1149 | 1208 | 484 | 1149 | 1189 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.3 | 0.0 | 12.3 | 12.7 | 0.0 | 11.9 | 7.9 | 10.0 | 10.0 | 8.6 | 10.0 | 10.0 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 1.1 | 0.0 | 0.8 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.8 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 2.2 | 2.3 | 0.0 | 1.6 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.6 | 0.0 | 12.5 | 12.7 | 0.0 | 11.9 | 7.9 | 11.2 | 11.1 | 8.6 | 10.7 | 10.7 |
| LnGrp LOS | B | A | B | B | A | B | A | B | B | A | B | B |
| Approach Vol, veh/h | | 177 | | | 5 | | | 903 | | | 672 | |
| Approach Delay, s/veh | | 13.3 | | | 12.1 | | | 11.1 | | | 10.7 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 4.9 | 20.4 | | 13.9 | 5.8 | 19.5 | | 13.9 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.0 | 26.8 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 10.2 | | 5.5 | 2.4 | 8.1 | | 3.1 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.8 | | 0.6 | 0.0 | 3.6 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 11.2 | |
| HCM 6th LOS | | B | |

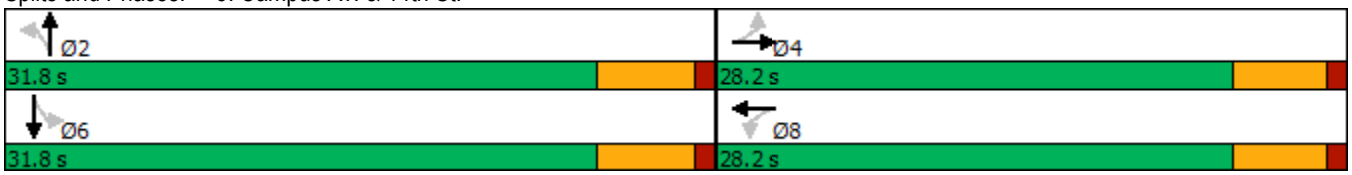
Notes

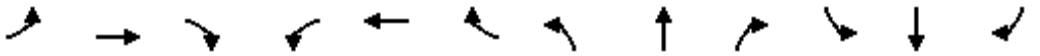
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 51 | 90 | 24 | 66 | 18 | 687 | 119 | 502 |
| Future Volume (vph) | 51 | 90 | 24 | 66 | 18 | 687 | 119 | 502 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 37.3 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 51 | 90 | 28 | 24 | 66 | 142 | 18 | 687 | 49 | 119 | 502 | 29 |
| Future Volume (veh/h) | 51 | 90 | 28 | 24 | 66 | 142 | 18 | 687 | 49 | 119 | 502 | 29 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 54 | 96 | 25 | 26 | 70 | 119 | 19 | 731 | 48 | 127 | 534 | 29 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 340 | 323 | 84 | 399 | 141 | 240 | 476 | 1524 | 100 | 392 | 1546 | 84 |
| Arrive On Green | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| Sat Flow, veh/h | 1069 | 1350 | 352 | 1136 | 589 | 1002 | 758 | 3202 | 210 | 620 | 3247 | 176 |
| Grp Volume(v), veh/h | 54 | 0 | 121 | 26 | 0 | 189 | 19 | 384 | 395 | 127 | 276 | 287 |
| Grp Sat Flow(s),veh/h/ln | 1069 | 0 | 1702 | 1136 | 0 | 1592 | 758 | 1683 | 1729 | 620 | 1683 | 1740 |
| Q Serve(g_s), s | 1.7 | 0.0 | 2.2 | 0.7 | 0.0 | 3.8 | 0.6 | 5.8 | 5.8 | 6.5 | 3.8 | 3.8 |
| Cycle Q Clear(g_c), s | 5.5 | 0.0 | 2.2 | 2.9 | 0.0 | 3.8 | 4.4 | 5.8 | 5.8 | 12.3 | 3.8 | 3.8 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 0.63 | 1.00 | | 0.12 | 1.00 | | 0.10 |
| Lane Grp Cap(c), veh/h | 340 | 0 | 408 | 399 | 0 | 381 | 476 | 801 | 823 | 392 | 801 | 828 |
| V/C Ratio(X) | 0.16 | 0.00 | 0.30 | 0.07 | 0.00 | 0.50 | 0.04 | 0.48 | 0.48 | 0.32 | 0.34 | 0.35 |
| Avail Cap(c_a), veh/h | 744 | 0 | 1051 | 829 | 0 | 983 | 652 | 1193 | 1225 | 537 | 1193 | 1234 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.6 | 0.0 | 11.6 | 12.8 | 0.0 | 12.2 | 7.5 | 6.6 | 6.6 | 10.8 | 6.1 | 6.1 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 0.4 | 0.1 | 0.0 | 1.0 | 0.0 | 0.4 | 0.4 | 0.5 | 0.3 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.7 | 0.2 | 0.0 | 1.2 | 0.1 | 1.1 | 1.2 | 0.6 | 0.7 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 0.0 | 12.0 | 12.8 | 0.0 | 13.2 | 7.6 | 7.1 | 7.1 | 11.3 | 6.4 | 6.4 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 175 | | | 215 | | | 798 | | | 690 | |
| Approach Delay, s/veh | | 12.9 | | | 13.2 | | | 7.1 | | | 7.3 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 23.1 | | 14.1 | | 23.1 | | 14.1 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 7.8 | | 7.5 | | 14.3 | | 5.8 | | | | |
| Green Ext Time (p_c), s | | 4.5 | | 0.7 | | 3.4 | | 1.1 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 8.4 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

# APPENDIX 5.1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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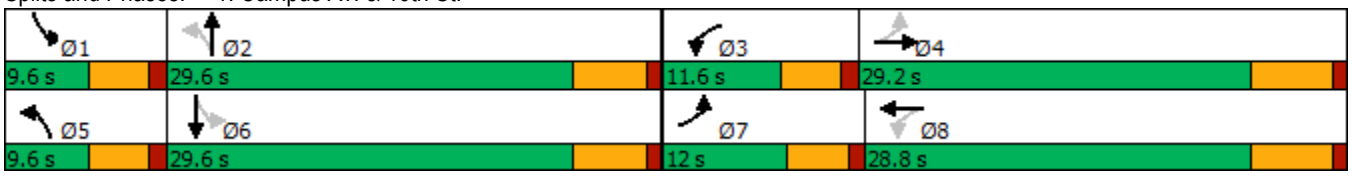
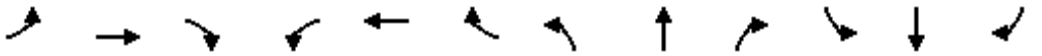
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 170 | 337 | 185 | 566 | 85 | 596 | 54 | 565 |
| Future Volume (vph) | 170 | 337 | 185 | 566 | 85 | 596 | 54 | 565 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 12.0 | 29.2 | 11.6 | 28.8 | 9.6 | 29.6 | 9.6 | 29.6 |
| Total Split (%) | 15.0% | 36.5% | 14.5% | 36.0% | 12.0% | 37.0% | 12.0% | 37.0% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 72.2 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 16th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 170 | 337 | 68 | 185 | 566 | 45 | 85 | 596 | 131 | 54 | 565 | 210 |
| Future Volume (veh/h) | 170 | 337 | 68 | 185 | 566 | 45 | 85 | 596 | 131 | 54 | 565 | 210 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.98 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 185 | 366 | 74 | 201 | 615 | 49 | 92 | 648 | 142 | 59 | 614 | 228 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 311 | 699 | 140 | 375 | 771 | 61 | 232 | 857 | 188 | 241 | 723 | 268 |
| Arrive On Green | 0.10 | 0.25 | 0.25 | 0.10 | 0.24 | 0.24 | 0.06 | 0.31 | 0.31 | 0.05 | 0.30 | 0.30 |
| Sat Flow, veh/h | 1594 | 2794 | 559 | 1594 | 3155 | 251 | 1594 | 2737 | 599 | 1594 | 2390 | 887 |
| Grp Volume(v), veh/h | 185 | 219 | 221 | 201 | 328 | 336 | 92 | 398 | 392 | 59 | 432 | 410 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1670 | 1594 | 1683 | 1723 | 1594 | 1683 | 1653 | 1594 | 1683 | 1594 |
| Q Serve(g_s), s | 6.0 | 7.9 | 8.1 | 6.7 | 12.9 | 12.9 | 2.8 | 15.0 | 15.1 | 1.8 | 17.0 | 17.0 |
| Cycle Q Clear(g_c), s | 6.0 | 7.9 | 8.1 | 6.7 | 12.9 | 12.9 | 2.8 | 15.0 | 15.1 | 1.8 | 17.0 | 17.0 |
| Prop In Lane | 1.00 | | 0.33 | 1.00 | | 0.15 | 1.00 | | 0.36 | 1.00 | | 0.56 |
| Lane Grp Cap(c), veh/h | 311 | 421 | 418 | 375 | 411 | 421 | 232 | 527 | 518 | 241 | 509 | 482 |
| V/C Ratio(X) | 0.59 | 0.52 | 0.53 | 0.54 | 0.80 | 0.80 | 0.40 | 0.76 | 0.76 | 0.25 | 0.85 | 0.85 |
| Avail Cap(c_a), veh/h | 311 | 558 | 554 | 375 | 549 | 561 | 251 | 577 | 567 | 276 | 577 | 546 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.5 | 22.8 | 22.9 | 17.9 | 25.0 | 25.0 | 17.7 | 21.8 | 21.8 | 17.0 | 23.1 | 23.1 |
| Incr Delay (d2), s/veh | 2.1 | 1.0 | 1.0 | 0.8 | 5.9 | 5.9 | 0.4 | 5.2 | 5.3 | 0.2 | 10.4 | 11.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.1 | 2.9 | 3.0 | 2.2 | 5.3 | 5.4 | 0.9 | 6.0 | 6.0 | 0.6 | 7.5 | 7.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.6 | 23.8 | 23.9 | 18.8 | 31.0 | 31.0 | 18.1 | 27.0 | 27.2 | 17.2 | 33.5 | 34.2 |
| LnGrp LOS | C | C | C | B | C | C | B | C | C | B | C | C |
| Approach Vol, veh/h | | 625 | | | 865 | | | 882 | | | 901 | |
| Approach Delay, s/veh | | 22.9 | | | 28.1 | | | 26.1 | | | 32.7 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.0 | 27.5 | 11.6 | 23.4 | 8.8 | 26.8 | 12.0 | 23.0 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 5.0 | 24.2 | 7.0 | 23.4 | 5.0 | 24.2 | 7.4 | 23.0 |
| Max Q Clear Time (g_c+I1), s | 3.8 | 17.1 | 8.7 | 10.1 | 4.8 | 19.0 | 8.0 | 14.9 |
| Green Ext Time (p_c), s | 0.0 | 2.7 | 0.0 | 1.9 | 0.0 | 2.3 | 0.0 | 2.3 |

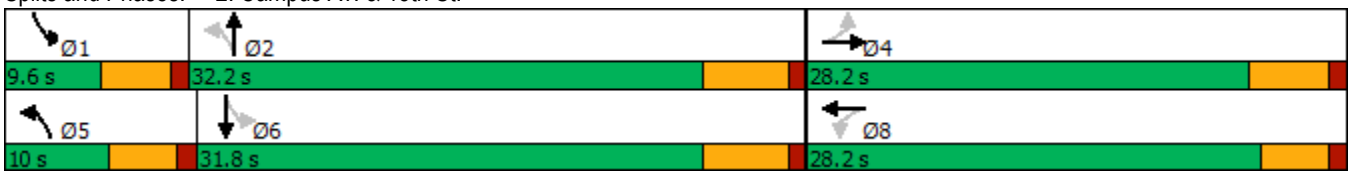
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 27.9 |
| HCM 6th LOS | C |

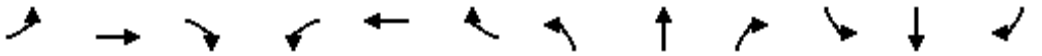
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 46 | 7 | 11 | 15 | 59 | 756 | 6 | 789 |
| Future Volume (vph) | 46 | 7 | 11 | 15 | 59 | 756 | 6 | 789 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 10.0 | 32.2 | 9.6 | 31.8 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 14.3% | 46.0% | 13.7% | 45.4% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 45.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 88 | 11 | 15 | 12 | 59 | 756 | 6 | 6 | 789 | 33 |
| Future Volume (veh/h) | 46 | 7 | 88 | 11 | 15 | 12 | 59 | 756 | 6 | 6 | 789 | 33 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 51 | 8 | 97 | 12 | 16 | 13 | 65 | 831 | 7 | 7 | 867 | 36 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 401 | 23 | 284 | 333 | 182 | 148 | 355 | 1481 | 12 | 330 | 1250 | 52 |
| Arrive On Green | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.06 | 0.43 | 0.43 | 0.01 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1236 | 115 | 1398 | 1150 | 898 | 730 | 1594 | 3421 | 29 | 1594 | 3293 | 137 |
| Grp Volume(v), veh/h | 51 | 0 | 105 | 12 | 0 | 29 | 65 | 409 | 429 | 7 | 443 | 460 |
| Grp Sat Flow(s),veh/h/ln | 1236 | 0 | 1514 | 1150 | 0 | 1628 | 1594 | 1683 | 1767 | 1594 | 1683 | 1747 |
| Q Serve(g_s), s | 1.5 | 0.0 | 2.5 | 0.4 | 0.0 | 0.6 | 1.0 | 7.8 | 7.8 | 0.1 | 9.5 | 9.5 |
| Cycle Q Clear(g_c), s | 2.1 | 0.0 | 2.5 | 2.9 | 0.0 | 0.6 | 1.0 | 7.8 | 7.8 | 0.1 | 9.5 | 9.5 |
| Prop In Lane | 1.00 | | 0.92 | 1.00 | | 0.45 | 1.00 | | 0.02 | 1.00 | | 0.08 |
| Lane Grp Cap(c), veh/h | 401 | 0 | 307 | 333 | 0 | 331 | 355 | 729 | 765 | 330 | 639 | 663 |
| V/C Ratio(X) | 0.13 | 0.00 | 0.34 | 0.04 | 0.00 | 0.09 | 0.18 | 0.56 | 0.56 | 0.02 | 0.69 | 0.69 |
| Avail Cap(c_a), veh/h | 813 | 0 | 812 | 733 | 0 | 897 | 456 | 1053 | 1105 | 501 | 1037 | 1076 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.7 | 0.0 | 14.6 | 15.9 | 0.0 | 13.9 | 8.1 | 9.1 | 9.1 | 8.4 | 11.2 | 11.2 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.7 | 0.0 | 0.0 | 0.1 | 0.1 | 0.7 | 0.6 | 0.0 | 1.4 | 1.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.8 | 0.1 | 0.0 | 0.2 | 0.2 | 2.0 | 2.1 | 0.0 | 2.7 | 2.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.9 | 0.0 | 15.3 | 15.9 | 0.0 | 14.0 | 8.2 | 9.8 | 9.7 | 8.4 | 12.6 | 12.5 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | A | B | B |
| Approach Vol, veh/h | | 156 | | | 41 | | | 903 | | | 910 | |
| Approach Delay, s/veh | | 15.1 | | | 14.5 | | | 9.7 | | | 12.5 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 24.0 | | 13.9 | 7.3 | 21.7 | | 13.9 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.4 | 26.4 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 9.8 | | 4.5 | 3.0 | 11.5 | | 4.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.6 | | 0.6 | 0.0 | 4.7 | | 0.1 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 11.5 |
| HCM 6th LOS | | B |

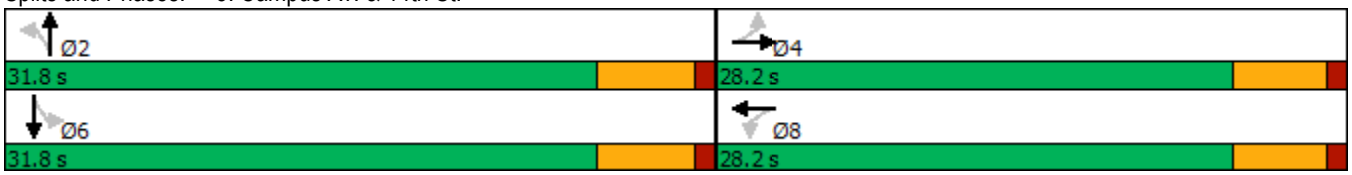
Notes

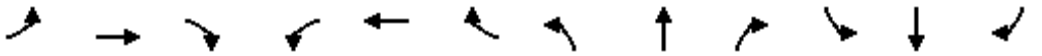
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 36 | 52 | 34 | 115 | 44 | 565 | 155 | 673 |
| Future Volume (vph) | 36 | 52 | 34 | 115 | 44 | 565 | 155 | 673 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 44.5 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 36 | 52 | 38 | 34 | 115 | 213 | 44 | 565 | 42 | 155 | 673 | 54 |
| Future Volume (veh/h) | 36 | 52 | 38 | 34 | 115 | 213 | 44 | 565 | 42 | 155 | 673 | 54 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 40 | 58 | 36 | 38 | 128 | 204 | 49 | 628 | 43 | 172 | 748 | 58 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 243 | 283 | 176 | 435 | 169 | 270 | 358 | 1540 | 105 | 407 | 1523 | 118 |
| Arrive On Green | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| Sat Flow, veh/h | 938 | 1022 | 634 | 1163 | 610 | 972 | 604 | 3196 | 219 | 685 | 3159 | 245 |
| Grp Volume(v), veh/h | 40 | 0 | 94 | 38 | 0 | 332 | 49 | 330 | 341 | 172 | 398 | 408 |
| Grp Sat Flow(s),veh/h/ln | 938 | 0 | 1656 | 1163 | 0 | 1581 | 604 | 1683 | 1731 | 685 | 1683 | 1721 |
| Q Serve(g_s), s | 1.8 | 0.0 | 1.9 | 1.1 | 0.0 | 8.5 | 2.6 | 5.6 | 5.6 | 9.5 | 7.1 | 7.1 |
| Cycle Q Clear(g_c), s | 10.3 | 0.0 | 1.9 | 3.1 | 0.0 | 8.5 | 9.7 | 5.6 | 5.6 | 15.1 | 7.1 | 7.1 |
| Prop In Lane | 1.00 | | 0.38 | 1.00 | | 0.61 | 1.00 | | 0.13 | 1.00 | | 0.14 |
| Lane Grp Cap(c), veh/h | 243 | 0 | 459 | 435 | 0 | 439 | 358 | 811 | 835 | 407 | 811 | 829 |
| V/C Ratio(X) | 0.16 | 0.00 | 0.20 | 0.09 | 0.00 | 0.76 | 0.14 | 0.41 | 0.41 | 0.42 | 0.49 | 0.49 |
| Avail Cap(c_a), veh/h | 473 | 0 | 865 | 720 | 0 | 826 | 429 | 1009 | 1038 | 487 | 1009 | 1031 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.2 | 0.0 | 12.2 | 13.4 | 0.0 | 14.6 | 11.0 | 7.4 | 7.4 | 12.2 | 7.7 | 7.7 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 2.7 | 0.2 | 0.3 | 0.3 | 0.7 | 0.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.6 | 0.3 | 0.0 | 2.9 | 0.3 | 1.3 | 1.3 | 1.1 | 1.7 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.6 | 0.0 | 12.4 | 13.4 | 0.0 | 17.3 | 11.2 | 7.7 | 7.7 | 12.9 | 8.2 | 8.2 |
| LnGrp LOS | B | A | B | B | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 134 | | | 370 | | | 720 | | | 978 | |
| Approach Delay, s/veh | | 14.5 | | | 16.9 | | | 7.9 | | | 9.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

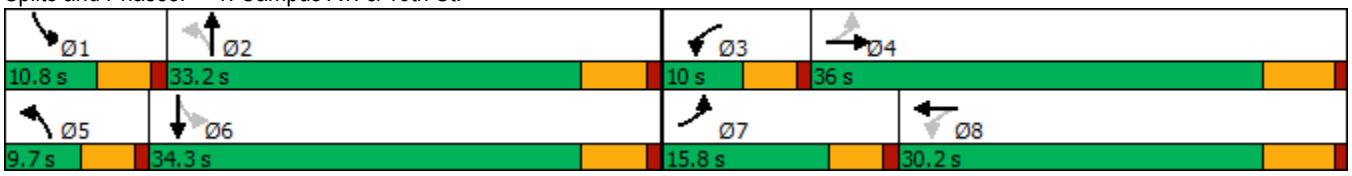
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 26.6 | | 17.4 | | 26.6 | | 17.4 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 11.7 | | 12.3 | | 17.1 | | 10.5 | | | | |
| Green Ext Time (p_c), s | | 3.8 | | 0.4 | | 4.1 | | 1.9 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 10.3 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 202 | 1002 | 120 | 346 | 86 | 697 | 142 | 514 |
| Future Volume (vph) | 202 | 1002 | 120 | 346 | 86 | 697 | 142 | 514 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 15.8 | 36.0 | 10.0 | 30.2 | 9.7 | 33.2 | 10.8 | 34.3 |
| Total Split (%) | 17.6% | 40.0% | 11.1% | 33.6% | 10.8% | 36.9% | 12.0% | 38.1% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 90 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 16th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 202 | 1002 | 102 | 120 | 346 | 75 | 86 | 697 | 305 | 142 | 514 | 181 |
| Future Volume (veh/h) | 202 | 1002 | 102 | 120 | 346 | 75 | 86 | 697 | 305 | 142 | 514 | 181 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 206 | 1022 | 104 | 122 | 353 | 77 | 88 | 711 | 311 | 145 | 524 | 185 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 408 | 1034 | 105 | 178 | 790 | 170 | 256 | 700 | 306 | 190 | 790 | 278 |
| Arrive On Green | 0.11 | 0.34 | 0.34 | 0.06 | 0.29 | 0.29 | 0.05 | 0.31 | 0.31 | 0.07 | 0.32 | 0.32 |
| Sat Flow, veh/h | 1594 | 3080 | 313 | 1594 | 2754 | 594 | 1594 | 2267 | 991 | 1594 | 2433 | 855 |
| Grp Volume(v), veh/h | 206 | 558 | 568 | 122 | 214 | 216 | 88 | 528 | 494 | 145 | 362 | 347 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1710 | 1594 | 1683 | 1665 | 1594 | 1683 | 1575 | 1594 | 1683 | 1604 |
| Q Serve(g_s), s | 7.8 | 29.7 | 29.7 | 4.9 | 9.4 | 9.6 | 3.4 | 27.8 | 27.8 | 5.6 | 16.6 | 16.8 |
| Cycle Q Clear(g_c), s | 7.8 | 29.7 | 29.7 | 4.9 | 9.4 | 9.6 | 3.4 | 27.8 | 27.8 | 5.6 | 16.6 | 16.8 |
| Prop In Lane | 1.00 | | 0.18 | 1.00 | | 0.36 | 1.00 | | 0.63 | 1.00 | | 0.53 |
| Lane Grp Cap(c), veh/h | 408 | 565 | 574 | 178 | 483 | 477 | 256 | 520 | 486 | 190 | 547 | 521 |
| V/C Ratio(X) | 0.50 | 0.99 | 0.99 | 0.69 | 0.44 | 0.45 | 0.34 | 1.02 | 1.02 | 0.76 | 0.66 | 0.67 |
| Avail Cap(c_a), veh/h | 433 | 565 | 574 | 178 | 483 | 477 | 262 | 520 | 486 | 190 | 547 | 521 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.6 | 29.7 | 29.7 | 24.5 | 26.2 | 26.3 | 20.9 | 31.1 | 31.1 | 23.5 | 26.1 | 26.2 |
| Incr Delay (d2), s/veh | 0.4 | 34.8 | 34.7 | 8.7 | 0.6 | 0.7 | 0.3 | 43.4 | 44.8 | 15.2 | 3.0 | 3.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 16.3 | 16.6 | 2.1 | 3.6 | 3.6 | 1.2 | 16.7 | 15.9 | 2.7 | 6.7 | 6.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.0 | 64.5 | 64.4 | 33.2 | 26.9 | 27.0 | 21.2 | 74.5 | 75.9 | 38.7 | 29.1 | 29.4 |
| LnGrp LOS | B | E | E | C | C | C | C | F | F | D | C | C |
| Approach Vol, veh/h | | 1332 | | | 552 | | | 1110 | | | 854 | |
| Approach Delay, s/veh | | 57.4 | | | 28.3 | | | 70.9 | | | 30.8 | |
| Approach LOS | | E | | | C | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 33.2 | 10.0 | 36.0 | 9.4 | 34.6 | 14.4 | 31.6 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 6.2 | 27.8 | 5.4 | 30.2 | 5.1 | 28.9 | 11.2 | 24.4 |
| Max Q Clear Time (g_c+I1), s | 7.6 | 29.8 | 6.9 | 31.7 | 5.4 | 18.8 | 9.8 | 11.6 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 1.8 |

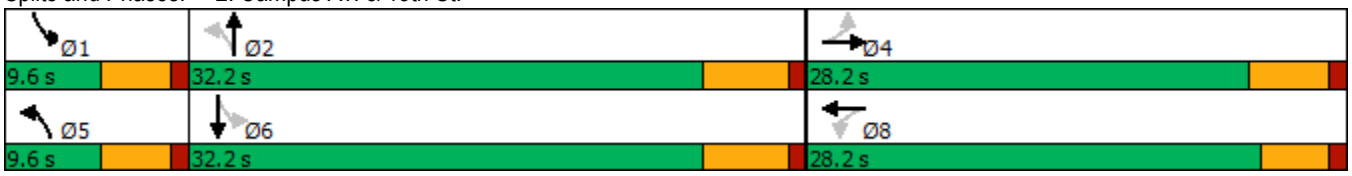
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 51.2 |
| HCM 6th LOS | D |

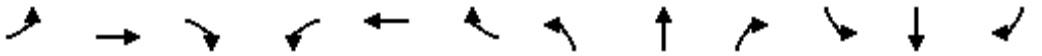
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 128 | 6 | 1 | 0 | 41 | 949 | 6 | 709 |
| Future Volume (vph) | 128 | 6 | 1 | 0 | 41 | 949 | 6 | 709 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 9.6 | 32.2 | 9.6 | 32.2 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 13.7% | 46.0% | 13.7% | 46.0% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 43
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 128 | 6 | 61 | 1 | 0 | 4 | 41 | 949 | 4 | 6 | 709 | 33 |
| Future Volume (veh/h) | 128 | 6 | 61 | 1 | 0 | 4 | 41 | 949 | 4 | 6 | 709 | 33 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 133 | 6 | 64 | 1 | 0 | 4 | 43 | 989 | 4 | 6 | 739 | 34 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 446 | 28 | 301 | 387 | 0 | 330 | 364 | 1413 | 6 | 272 | 1219 | 56 |
| Arrive On Green | 0.22 | 0.22 | 0.22 | 0.22 | 0.00 | 0.22 | 0.05 | 0.41 | 0.41 | 0.01 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1264 | 128 | 1369 | 1188 | 0 | 1502 | 1594 | 3439 | 14 | 1594 | 3277 | 151 |
| Grp Volume(v), veh/h | 133 | 0 | 70 | 1 | 0 | 4 | 43 | 484 | 509 | 6 | 379 | 394 |
| Grp Sat Flow(s),veh/h/ln | 1264 | 0 | 1497 | 1188 | 0 | 1502 | 1594 | 1683 | 1769 | 1594 | 1683 | 1745 |
| Q Serve(g_s), s | 3.9 | 0.0 | 1.6 | 0.0 | 0.0 | 0.1 | 0.7 | 10.0 | 10.0 | 0.1 | 7.7 | 7.7 |
| Cycle Q Clear(g_c), s | 4.0 | 0.0 | 1.6 | 1.6 | 0.0 | 0.1 | 0.7 | 10.0 | 10.0 | 0.1 | 7.7 | 7.7 |
| Prop In Lane | 1.00 | | 0.91 | 1.00 | | 1.00 | 1.00 | | 0.01 | 1.00 | | 0.09 |
| Lane Grp Cap(c), veh/h | 446 | 0 | 329 | 387 | 0 | 330 | 364 | 691 | 727 | 272 | 626 | 649 |
| V/C Ratio(X) | 0.30 | 0.00 | 0.21 | 0.00 | 0.00 | 0.01 | 0.12 | 0.70 | 0.70 | 0.02 | 0.61 | 0.61 |
| Avail Cap(c_a), veh/h | 860 | 0 | 819 | 793 | 0 | 843 | 479 | 1073 | 1128 | 449 | 1073 | 1112 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.4 | 0.0 | 13.4 | 14.1 | 0.0 | 12.8 | 8.1 | 10.2 | 10.2 | 9.0 | 10.7 | 10.7 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 1.3 | 1.2 | 0.0 | 1.0 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.2 | 2.6 | 2.8 | 0.0 | 2.1 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 0.0 | 13.7 | 14.1 | 0.0 | 12.9 | 8.1 | 11.5 | 11.5 | 9.0 | 11.7 | 11.6 |
| LnGrp LOS | B | A | B | B | A | B | A | B | B | A | B | B |
| Approach Vol, veh/h | | 203 | | | 5 | | | 1036 | | | 779 | |
| Approach Delay, s/veh | | 14.4 | | | 13.1 | | | 11.4 | | | 11.6 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 4.9 | 22.7 | | 14.4 | 6.6 | 21.0 | | 14.4 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.0 | 26.8 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 12.0 | | 6.0 | 2.7 | 9.7 | | 3.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.3 | | 0.7 | 0.0 | 4.2 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 11.8 | |
| HCM 6th LOS | | B | |

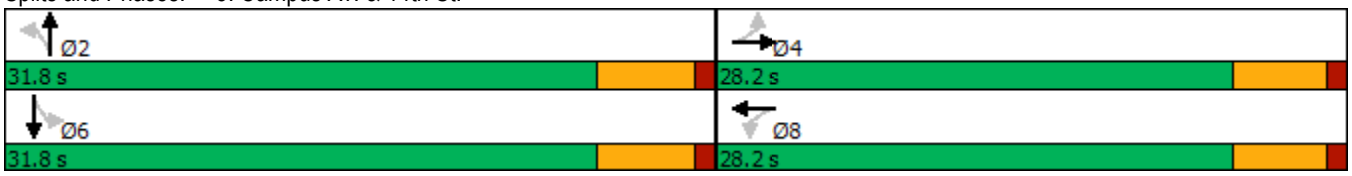
**Notes**

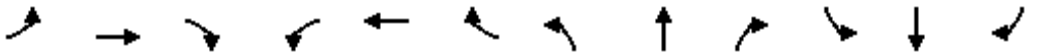
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 54 | 96 | 25 | 70 | 33 | 803 | 126 | 611 |
| Future Volume (vph) | 54 | 96 | 25 | 70 | 33 | 803 | 126 | 611 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 42.5 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 54 | 96 | 45 | 25 | 70 | 151 | 33 | 803 | 52 | 126 | 611 | 31 |
| Future Volume (veh/h) | 54 | 96 | 45 | 25 | 70 | 151 | 33 | 803 | 52 | 126 | 611 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 57 | 102 | 43 | 27 | 74 | 129 | 35 | 854 | 51 | 134 | 650 | 31 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 293 | 265 | 112 | 344 | 131 | 228 | 445 | 1665 | 99 | 364 | 1690 | 81 |
| Arrive On Green | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 |
| Sat Flow, veh/h | 1055 | 1177 | 496 | 1111 | 580 | 1010 | 679 | 3223 | 192 | 551 | 3271 | 156 |
| Grp Volume(v), veh/h | 57 | 0 | 145 | 27 | 0 | 203 | 35 | 446 | 459 | 134 | 334 | 347 |
| Grp Sat Flow(s),veh/h/ln | 1055 | 0 | 1673 | 1111 | 0 | 1590 | 679 | 1683 | 1732 | 551 | 1683 | 1744 |
| Q Serve(g_s), s | 2.1 | 0.0 | 3.0 | 0.9 | 0.0 | 4.7 | 1.3 | 7.2 | 7.2 | 8.7 | 4.9 | 4.9 |
| Cycle Q Clear(g_c), s | 6.7 | 0.0 | 3.0 | 3.9 | 0.0 | 4.7 | 6.3 | 7.2 | 7.2 | 15.9 | 4.9 | 4.9 |
| Prop In Lane | 1.00 | | 0.30 | 1.00 | | 0.64 | 1.00 | | 0.11 | 1.00 | | 0.09 |
| Lane Grp Cap(c), veh/h | 293 | 0 | 377 | 344 | 0 | 359 | 445 | 870 | 895 | 364 | 870 | 901 |
| V/C Ratio(X) | 0.19 | 0.00 | 0.38 | 0.08 | 0.00 | 0.57 | 0.08 | 0.51 | 0.51 | 0.37 | 0.38 | 0.38 |
| Avail Cap(c_a), veh/h | 645 | 0 | 936 | 715 | 0 | 889 | 530 | 1080 | 1112 | 433 | 1080 | 1119 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 17.1 | 0.0 | 13.5 | 15.2 | 0.0 | 14.1 | 7.9 | 6.5 | 6.5 | 11.7 | 6.0 | 6.0 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.6 | 0.1 | 0.0 | 1.4 | 0.1 | 0.5 | 0.5 | 0.6 | 0.3 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 1.0 | 0.2 | 0.0 | 1.6 | 0.1 | 1.4 | 1.5 | 0.8 | 1.0 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.5 | 0.0 | 14.1 | 15.3 | 0.0 | 15.5 | 8.0 | 7.0 | 7.0 | 12.4 | 6.3 | 6.3 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 202 | | | 230 | | | 940 | | | 815 | |
| Approach Delay, s/veh | | 15.1 | | | 15.5 | | | 7.0 | | | 7.3 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 26.7 | | 14.5 | | 26.7 | | 14.5 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 9.2 | | 8.7 | | 17.9 | | 6.7 | | | | |
| Green Ext Time (p_c), s | | 5.4 | | 0.8 | | 3.4 | | 1.2 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 8.8 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

# APPENDIX 5.2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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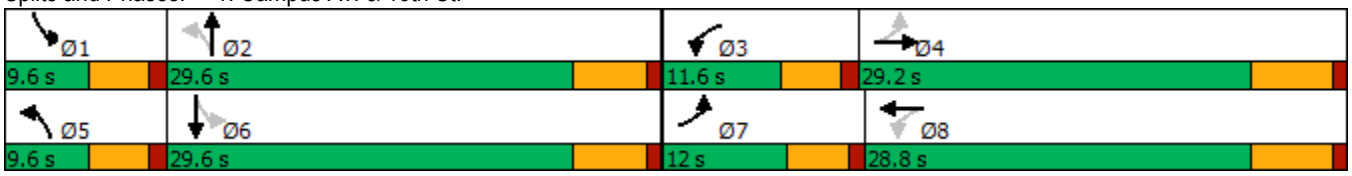
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 170 | 337 | 186 | 566 | 87 | 606 | 54 | 569 |
| Future Volume (vph) | 170 | 337 | 186 | 566 | 87 | 606 | 54 | 569 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 12.0 | 29.2 | 11.6 | 28.8 | 9.6 | 29.6 | 9.6 | 29.6 |
| Total Split (%) | 15.0% | 36.5% | 14.5% | 36.0% | 12.0% | 37.0% | 12.0% | 37.0% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 80 |
| Actuated Cycle Length: 72.3 |
| Natural Cycle: 80 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 16th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 170 | 337 | 69 | 186 | 566 | 45 | 87 | 606 | 134 | 54 | 569 | 210 |
| Future Volume (veh/h) | 170 | 337 | 69 | 186 | 566 | 45 | 87 | 606 | 134 | 54 | 569 | 210 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.98 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 185 | 366 | 75 | 202 | 615 | 49 | 95 | 659 | 146 | 59 | 618 | 228 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 310 | 696 | 141 | 374 | 770 | 61 | 232 | 859 | 190 | 237 | 726 | 268 |
| Arrive On Green | 0.10 | 0.25 | 0.25 | 0.10 | 0.24 | 0.24 | 0.06 | 0.31 | 0.31 | 0.05 | 0.30 | 0.30 |
| Sat Flow, veh/h | 1594 | 2787 | 565 | 1594 | 3155 | 251 | 1594 | 2731 | 604 | 1594 | 2395 | 883 |
| Grp Volume(v), veh/h | 185 | 220 | 221 | 202 | 328 | 336 | 95 | 406 | 399 | 59 | 434 | 412 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1669 | 1594 | 1683 | 1723 | 1594 | 1683 | 1652 | 1594 | 1683 | 1594 |
| Q Serve(g_s), s | 6.1 | 8.0 | 8.1 | 6.7 | 12.9 | 13.0 | 2.9 | 15.4 | 15.5 | 1.8 | 17.1 | 17.2 |
| Cycle Q Clear(g_c), s | 6.1 | 8.0 | 8.1 | 6.7 | 12.9 | 13.0 | 2.9 | 15.4 | 15.5 | 1.8 | 17.1 | 17.2 |
| Prop In Lane | 1.00 | | 0.34 | 1.00 | | 0.15 | 1.00 | | 0.37 | 1.00 | | 0.55 |
| Lane Grp Cap(c), veh/h | 310 | 421 | 417 | 374 | 411 | 421 | 232 | 529 | 519 | 237 | 510 | 483 |
| V/C Ratio(X) | 0.60 | 0.52 | 0.53 | 0.54 | 0.80 | 0.80 | 0.41 | 0.77 | 0.77 | 0.25 | 0.85 | 0.85 |
| Avail Cap(c_a), veh/h | 310 | 557 | 552 | 374 | 547 | 560 | 250 | 576 | 565 | 272 | 576 | 545 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.6 | 22.9 | 23.0 | 18.0 | 25.1 | 25.1 | 17.8 | 21.9 | 21.9 | 17.1 | 23.1 | 23.2 |
| Incr Delay (d2), s/veh | 2.2 | 1.0 | 1.1 | 0.9 | 6.0 | 6.0 | 0.4 | 5.7 | 5.9 | 0.2 | 10.7 | 11.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.1 | 2.9 | 3.0 | 2.2 | 5.3 | 5.4 | 1.0 | 6.3 | 6.2 | 0.6 | 7.6 | 7.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.8 | 23.9 | 24.0 | 18.9 | 31.1 | 31.1 | 18.2 | 27.6 | 27.8 | 17.3 | 33.8 | 34.5 |
| LnGrp LOS | C | C | C | B | C | C | B | C | C | B | C | C |
| Approach Vol, veh/h | | 626 | | | 866 | | | 900 | | | 905 | |
| Approach Delay, s/veh | | 23.0 | | | 28.2 | | | 26.7 | | | 33.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.0 | 27.6 | 11.6 | 23.5 | 8.8 | 26.8 | 12.0 | 23.1 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 5.0 | 24.2 | 7.0 | 23.4 | 5.0 | 24.2 | 7.4 | 23.0 |
| Max Q Clear Time (g_c+I1), s | 3.8 | 17.5 | 8.7 | 10.1 | 4.9 | 19.2 | 8.1 | 15.0 |
| Green Ext Time (p_c), s | 0.0 | 2.6 | 0.0 | 1.9 | 0.0 | 2.2 | 0.0 | 2.3 |

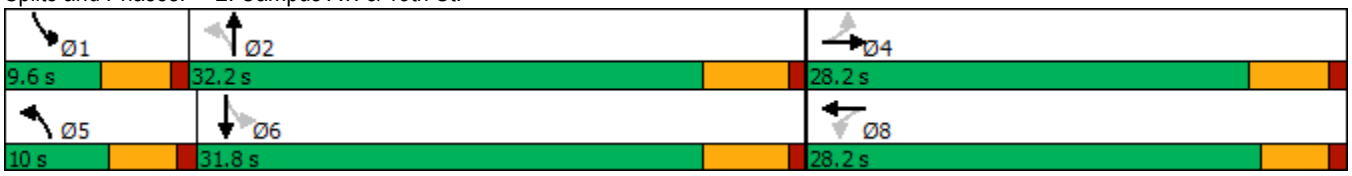
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.1 |
| HCM 6th LOS | C |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 46 | 7 | 11 | 15 | 61 | 771 | 6 | 794 |
| Future Volume (vph) | 46 | 7 | 11 | 15 | 61 | 771 | 6 | 794 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 10.0 | 32.2 | 9.6 | 31.8 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 14.3% | 46.0% | 13.7% | 45.4% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 45.3
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 7 | 89 | 11 | 15 | 12 | 61 | 771 | 6 | 6 | 794 | 33 |
| Future Volume (veh/h) | 46 | 7 | 89 | 11 | 15 | 12 | 61 | 771 | 6 | 6 | 794 | 33 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 51 | 8 | 98 | 12 | 16 | 13 | 67 | 847 | 7 | 7 | 873 | 36 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 400 | 23 | 284 | 331 | 182 | 148 | 355 | 1489 | 12 | 326 | 1254 | 52 |
| Arrive On Green | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.06 | 0.44 | 0.44 | 0.01 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1236 | 114 | 1399 | 1149 | 898 | 730 | 1594 | 3422 | 28 | 1594 | 3295 | 136 |
| Grp Volume(v), veh/h | 51 | 0 | 106 | 12 | 0 | 29 | 67 | 417 | 437 | 7 | 446 | 463 |
| Grp Sat Flow(s),veh/h/ln | 1236 | 0 | 1514 | 1149 | 0 | 1628 | 1594 | 1683 | 1767 | 1594 | 1683 | 1747 |
| Q Serve(g_s), s | 1.5 | 0.0 | 2.6 | 0.4 | 0.0 | 0.6 | 1.1 | 8.0 | 8.0 | 0.1 | 9.6 | 9.6 |
| Cycle Q Clear(g_c), s | 2.1 | 0.0 | 2.6 | 3.0 | 0.0 | 0.6 | 1.1 | 8.0 | 8.0 | 0.1 | 9.6 | 9.6 |
| Prop In Lane | 1.00 | | 0.92 | 1.00 | | 0.45 | 1.00 | | 0.02 | 1.00 | | 0.08 |
| Lane Grp Cap(c), veh/h | 400 | 0 | 307 | 331 | 0 | 330 | 355 | 733 | 769 | 326 | 641 | 665 |
| V/C Ratio(X) | 0.13 | 0.00 | 0.35 | 0.04 | 0.00 | 0.09 | 0.19 | 0.57 | 0.57 | 0.02 | 0.70 | 0.70 |
| Avail Cap(c_a), veh/h | 809 | 0 | 808 | 727 | 0 | 892 | 453 | 1047 | 1099 | 496 | 1031 | 1070 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.8 | 0.0 | 14.7 | 16.0 | 0.0 | 13.9 | 8.2 | 9.1 | 9.1 | 8.4 | 11.2 | 11.2 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.7 | 0.0 | 0.0 | 0.1 | 0.1 | 0.7 | 0.7 | 0.0 | 1.4 | 1.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.8 | 0.1 | 0.0 | 0.2 | 0.2 | 2.0 | 2.1 | 0.0 | 2.7 | 2.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.9 | 0.0 | 15.4 | 16.0 | 0.0 | 14.1 | 8.3 | 9.8 | 9.8 | 8.4 | 12.6 | 12.6 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | A | B | B |
| Approach Vol, veh/h | | 157 | | | 41 | | | 921 | | | 916 | |
| Approach Delay, s/veh | | 15.2 | | | 14.6 | | | 9.7 | | | 12.6 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 24.2 | | 13.9 | 7.4 | 21.8 | | 13.9 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.4 | 26.4 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 10.0 | | 4.6 | 3.1 | 11.6 | | 5.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.7 | | 0.7 | 0.0 | 4.8 | | 0.1 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 11.5 |
| HCM 6th LOS | | B |

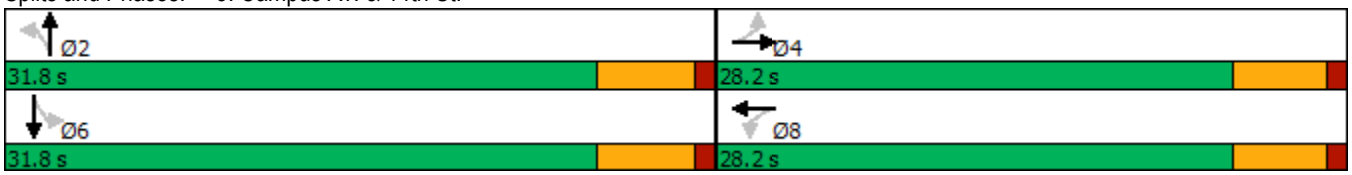
Notes

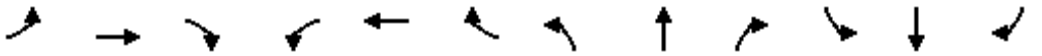
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 36 | 54 | 41 | 120 | 44 | 565 | 161 | 673 |
| Future Volume (vph) | 36 | 54 | 41 | 120 | 44 | 565 | 161 | 673 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 45.4 |
| Natural Cycle: 60 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 36 | 54 | 38 | 41 | 120 | 230 | 44 | 565 | 44 | 161 | 673 | 54 |
| Future Volume (veh/h) | 36 | 54 | 38 | 41 | 120 | 230 | 44 | 565 | 44 | 161 | 673 | 54 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 40 | 60 | 36 | 46 | 133 | 223 | 49 | 628 | 45 | 179 | 748 | 58 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 233 | 301 | 181 | 442 | 171 | 288 | 348 | 1530 | 110 | 396 | 1517 | 118 |
| Arrive On Green | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| Sat Flow, veh/h | 917 | 1037 | 622 | 1161 | 590 | 988 | 604 | 3185 | 228 | 684 | 3159 | 245 |
| Grp Volume(v), veh/h | 40 | 0 | 96 | 46 | 0 | 356 | 49 | 332 | 341 | 179 | 398 | 408 |
| Grp Sat Flow(s),veh/h/ln | 917 | 0 | 1658 | 1161 | 0 | 1578 | 604 | 1683 | 1730 | 684 | 1683 | 1721 |
| Q Serve(g_s), s | 1.9 | 0.0 | 2.0 | 1.4 | 0.0 | 9.6 | 2.8 | 5.9 | 5.9 | 10.6 | 7.5 | 7.5 |
| Cycle Q Clear(g_c), s | 11.5 | 0.0 | 2.0 | 3.5 | 0.0 | 9.6 | 10.3 | 5.9 | 5.9 | 16.6 | 7.5 | 7.5 |
| Prop In Lane | 1.00 | | 0.38 | 1.00 | | 0.63 | 1.00 | | 0.13 | 1.00 | | 0.14 |
| Lane Grp Cap(c), veh/h | 233 | 0 | 482 | 442 | 0 | 459 | 348 | 809 | 831 | 396 | 809 | 827 |
| V/C Ratio(X) | 0.17 | 0.00 | 0.20 | 0.10 | 0.00 | 0.78 | 0.14 | 0.41 | 0.41 | 0.45 | 0.49 | 0.49 |
| Avail Cap(c_a), veh/h | 421 | 0 | 823 | 681 | 0 | 783 | 402 | 959 | 986 | 458 | 959 | 980 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.3 | 0.0 | 12.4 | 13.7 | 0.0 | 15.0 | 11.7 | 7.8 | 7.8 | 13.2 | 8.2 | 8.2 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 2.8 | 0.2 | 0.3 | 0.3 | 0.8 | 0.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 0.0 | 0.6 | 0.3 | 0.0 | 3.3 | 0.3 | 1.4 | 1.5 | 1.3 | 1.8 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.7 | 0.0 | 12.6 | 13.8 | 0.0 | 17.9 | 11.9 | 8.1 | 8.1 | 14.0 | 8.7 | 8.7 |
| LnGrp LOS | C | A | B | B | A | B | B | A | A | B | A | A |
| Approach Vol, veh/h | | 136 | | | 402 | | | 722 | | | 985 | |
| Approach Delay, s/veh | | 14.9 | | | 17.4 | | | 8.4 | | | 9.6 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 27.7 | | 18.7 | | 27.7 | | 18.7 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 12.3 | | 13.5 | | 18.6 | | 11.6 | | | | |
| Green Ext Time (p_c), s | | 3.7 | | 0.4 | | 3.7 | | 2.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 10.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | ↑ | ↑ | | Y | |
| Traffic Vol, veh/h | 0 | 2 | 6 | 0 | 5 | 0 |
| Future Vol, veh/h | 0 | 2 | 6 | 0 | 5 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 2 | 7 | 0 | 5 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | - | 0 | 9 | 7 |
| Stage 1 | - | - | - | - | 7 | - |
| Stage 2 | - | - | - | - | 2 | - |
| Critical Hdwy | - | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | 1011 | 1075 |
| Stage 1 | 0 | - | - | 0 | 1016 | - |
| Stage 2 | 0 | - | - | 0 | 1021 | - |
| Platoon blocked, % | | - | - | | | |
| Mov Cap-1 Maneuver | - | - | - | - | 1011 | 1075 |
| Mov Cap-2 Maneuver | - | - | - | - | 1011 | - |
| Stage 1 | - | - | - | - | 1016 | - |
| Stage 2 | - | - | - | - | 1021 | - |

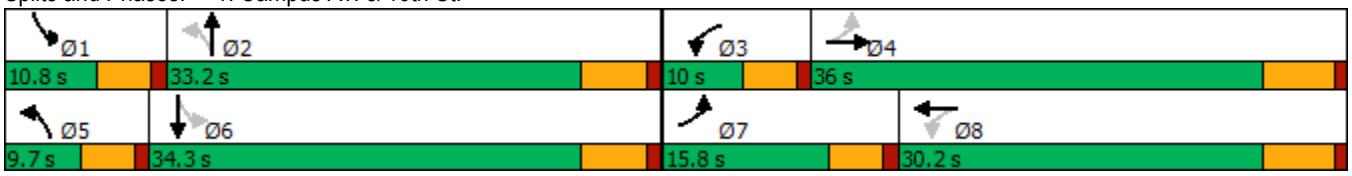
| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s/v | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBT | WBT | SBLn1 |
|---|---|---|---|
| Capacity (veh/h) | - | - | 1011 |
| HCM Lane V/C Ratio | - | - | 0.005 |
| HCM Control Delay (s/veh) | - | - | 8.6 |
| HCM Lane LOS | - | - | A |
| HCM 95th %tile Q (veh) | - | - | 0 |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 202 | 1002 | 124 | 346 | 87 | 704 | 142 | 525 |
| Future Volume (vph) | 202 | 1002 | 124 | 346 | 87 | 704 | 142 | 525 |
| Turn Type | pm+pt | NA | pm+pt | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 9.6 | 28.8 | 9.6 | 28.8 | 9.6 | 28.4 | 9.6 | 28.4 |
| Total Split (s) | 15.8 | 36.0 | 10.0 | 30.2 | 9.7 | 33.2 | 10.8 | 34.3 |
| Total Split (%) | 17.6% | 40.0% | 11.1% | 33.6% | 10.8% | 36.9% | 12.0% | 38.1% |
| Yellow Time (s) | 3.6 | 4.8 | 3.6 | 4.8 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.6 | 5.8 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | Lead | Lag | Lead | Lag | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 90 |
| Actuated Cycle Length: 90 |
| Natural Cycle: 90 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 1: Campus Av. & 16th St.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 202 | 1002 | 104 | 124 | 346 | 75 | 87 | 704 | 307 | 142 | 525 | 181 |
| Future Volume (veh/h) | 202 | 1002 | 104 | 124 | 346 | 75 | 87 | 704 | 307 | 142 | 525 | 181 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 206 | 1022 | 106 | 127 | 353 | 77 | 89 | 718 | 313 | 145 | 536 | 185 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 408 | 1031 | 107 | 178 | 790 | 170 | 253 | 701 | 306 | 190 | 794 | 273 |
| Arrive On Green | 0.11 | 0.34 | 0.34 | 0.06 | 0.29 | 0.29 | 0.05 | 0.31 | 0.31 | 0.07 | 0.32 | 0.32 |
| Sat Flow, veh/h | 1594 | 3074 | 319 | 1594 | 2754 | 594 | 1594 | 2270 | 989 | 1594 | 2449 | 842 |
| Grp Volume(v), veh/h | 206 | 559 | 569 | 127 | 214 | 216 | 89 | 532 | 499 | 145 | 368 | 353 |
| Grp Sat Flow(s),veh/h/ln | 1594 | 1683 | 1709 | 1594 | 1683 | 1665 | 1594 | 1683 | 1575 | 1594 | 1683 | 1607 |
| Q Serve(g_s), s | 7.8 | 29.8 | 29.8 | 5.1 | 9.4 | 9.6 | 3.4 | 27.8 | 27.8 | 5.6 | 17.0 | 17.1 |
| Cycle Q Clear(g_c), s | 7.8 | 29.8 | 29.8 | 5.1 | 9.4 | 9.6 | 3.4 | 27.8 | 27.8 | 5.6 | 17.0 | 17.1 |
| Prop In Lane | 1.00 | | 0.19 | 1.00 | | 0.36 | 1.00 | | 0.63 | 1.00 | | 0.52 |
| Lane Grp Cap(c), veh/h | 408 | 565 | 574 | 178 | 483 | 477 | 253 | 520 | 487 | 190 | 546 | 521 |
| V/C Ratio(X) | 0.50 | 0.99 | 0.99 | 0.72 | 0.44 | 0.45 | 0.35 | 1.02 | 1.02 | 0.76 | 0.67 | 0.68 |
| Avail Cap(c_a), veh/h | 433 | 565 | 574 | 178 | 483 | 477 | 258 | 520 | 487 | 190 | 546 | 521 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.6 | 29.8 | 29.8 | 24.6 | 26.2 | 26.3 | 21.0 | 31.1 | 31.1 | 23.5 | 26.3 | 26.3 |
| Incr Delay (d2), s/veh | 0.4 | 35.3 | 35.3 | 11.1 | 0.6 | 0.7 | 0.3 | 45.7 | 47.2 | 15.2 | 3.3 | 3.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 16.5 | 16.7 | 2.3 | 3.6 | 3.6 | 1.2 | 17.1 | 16.2 | 2.7 | 6.9 | 6.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.0 | 65.1 | 65.0 | 35.7 | 26.9 | 27.0 | 21.3 | 76.8 | 78.3 | 38.7 | 29.5 | 29.8 |
| LnGrp LOS | B | E | E | D | C | C | C | F | F | D | C | C |
| Approach Vol, veh/h | | 1334 | | | 557 | | | 1120 | | | 866 | |
| Approach Delay, s/veh | | 57.9 | | | 28.9 | | | 73.1 | | | 31.2 | |
| Approach LOS | | E | | | C | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 33.2 | 10.0 | 36.0 | 9.4 | 34.6 | 14.4 | 31.6 |
| Change Period (Y+Rc), s | 4.6 | 5.4 | 4.6 | 5.8 | 4.6 | 5.4 | 4.6 | 5.8 |
| Max Green Setting (Gmax), s | 6.2 | 27.8 | 5.4 | 30.2 | 5.1 | 28.9 | 11.2 | 24.4 |
| Max Q Clear Time (g_c+I1), s | 7.6 | 29.8 | 7.1 | 31.8 | 5.4 | 19.1 | 9.8 | 11.6 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 1.8 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 52.2 |
| HCM 6th LOS | D |

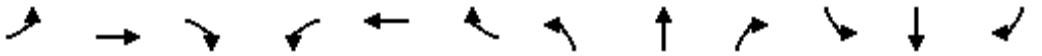
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 128 | 6 | 1 | 0 | 42 | 959 | 6 | 726 |
| Future Volume (vph) | 128 | 6 | 1 | 0 | 42 | 959 | 6 | 726 |
| Turn Type | Perm | NA | Perm | NA | pm+pt | NA | pm+pt | NA |
| Protected Phases | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 5 | 2 | 1 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 10.0 | 5.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 27.6 | 27.6 | 9.6 | 27.4 | 9.6 | 27.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 9.6 | 32.2 | 9.6 | 32.2 |
| Total Split (%) | 40.3% | 40.3% | 40.3% | 40.3% | 13.7% | 46.0% | 13.7% | 46.0% |
| Yellow Time (s) | 4.2 | 4.2 | 3.6 | 3.6 | 3.6 | 4.4 | 3.6 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 4.6 | 4.6 | 4.6 | 5.4 | 4.6 | 5.4 |
| Lead/Lag | | | | | Lead | Lag | Lead | Lag |
| Lead-Lag Optimize? | | | | | Yes | Yes | Yes | Yes |
| Recall Mode | None | None | None | None | None | None | None | None |

**Intersection Summary**

Cycle Length: 70
Actuated Cycle Length: 43.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Campus Av. & 15th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 128 | 6 | 63 | 1 | 0 | 4 | 42 | 959 | 4 | 6 | 726 | 33 |
| Future Volume (veh/h) | 128 | 6 | 63 | 1 | 0 | 4 | 42 | 959 | 4 | 6 | 726 | 33 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 133 | 6 | 66 | 1 | 0 | 4 | 44 | 999 | 4 | 6 | 756 | 34 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 445 | 27 | 301 | 383 | 0 | 329 | 360 | 1421 | 6 | 270 | 1225 | 55 |
| Arrive On Green | 0.22 | 0.22 | 0.22 | 0.22 | 0.00 | 0.22 | 0.05 | 0.41 | 0.41 | 0.01 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1264 | 125 | 1372 | 1186 | 0 | 1502 | 1594 | 3439 | 14 | 1594 | 3281 | 148 |
| Grp Volume(v), veh/h | 133 | 0 | 72 | 1 | 0 | 4 | 44 | 489 | 514 | 6 | 388 | 402 |
| Grp Sat Flow(s),veh/h/ln | 1264 | 0 | 1497 | 1186 | 0 | 1502 | 1594 | 1683 | 1769 | 1594 | 1683 | 1745 |
| Q Serve(g_s), s | 3.9 | 0.0 | 1.7 | 0.0 | 0.0 | 0.1 | 0.7 | 10.2 | 10.2 | 0.1 | 7.9 | 7.9 |
| Cycle Q Clear(g_c), s | 4.0 | 0.0 | 1.7 | 1.7 | 0.0 | 0.1 | 0.7 | 10.2 | 10.2 | 0.1 | 7.9 | 7.9 |
| Prop In Lane | 1.00 | | 0.92 | 1.00 | | 1.00 | 1.00 | | 0.01 | 1.00 | | 0.08 |
| Lane Grp Cap(c), veh/h | 445 | 0 | 328 | 383 | 0 | 329 | 360 | 695 | 731 | 270 | 629 | 652 |
| V/C Ratio(X) | 0.30 | 0.00 | 0.22 | 0.00 | 0.00 | 0.01 | 0.12 | 0.70 | 0.70 | 0.02 | 0.62 | 0.62 |
| Avail Cap(c_a), veh/h | 855 | 0 | 814 | 786 | 0 | 839 | 473 | 1067 | 1122 | 446 | 1067 | 1107 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.5 | 0.0 | 13.5 | 14.2 | 0.0 | 12.9 | 8.1 | 10.3 | 10.3 | 9.0 | 10.8 | 10.8 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 1.3 | 1.2 | 0.0 | 1.0 | 1.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.2 | 2.7 | 2.8 | 0.0 | 2.2 | 2.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 0.0 | 13.9 | 14.2 | 0.0 | 12.9 | 8.1 | 11.6 | 11.5 | 9.0 | 11.8 | 11.7 |
| LnGrp LOS | B | A | B | B | A | B | A | B | B | A | B | B |
| Approach Vol, veh/h | | 205 | | | 5 | | | 1047 | | | 796 | |
| Approach Delay, s/veh | | 14.5 | | | 13.2 | | | 11.4 | | | 11.7 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 4.9 | 22.9 | | 14.5 | 6.6 | 21.2 | | 14.5 | | | | |
| Change Period (Y+Rc), s | 4.6 | 5.4 | | 5.2 | 4.6 | 5.4 | | * 5.2 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 26.8 | | 23.0 | 5.0 | 26.8 | | * 24 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.1 | 12.2 | | 6.0 | 2.7 | 9.9 | | 3.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.3 | | 0.7 | 0.0 | 4.3 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 11.8 | |
| HCM 6th LOS | | B | |

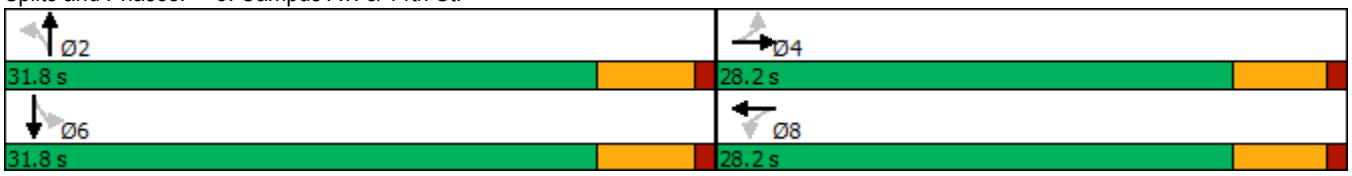
Notes

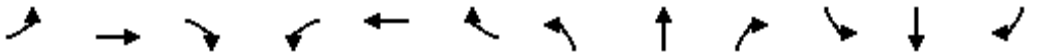
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (vph) | 54 | 102 | 30 | 73 | 33 | 803 | 145 | 611 |
| Future Volume (vph) | 54 | 102 | 30 | 73 | 33 | 803 | 145 | 611 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 22.4 | 22.4 | 22.4 | 22.4 |
| Total Split (s) | 28.2 | 28.2 | 28.2 | 28.2 | 31.8 | 31.8 | 31.8 | 31.8 |
| Total Split (%) | 47.0% | 47.0% | 47.0% | 47.0% | 53.0% | 53.0% | 53.0% | 53.0% |
| Yellow Time (s) | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | 4.4 | 4.4 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | 5.2 | 5.2 | 5.2 | 5.4 | 5.4 | 5.4 | 5.4 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | None | None | None | None |

| Intersection Summary |
|---|
| Cycle Length: 60 |
| Actuated Cycle Length: 48.7 |
| Natural Cycle: 65 |
| Control Type: Actuated-Uncoordinated |

Splits and Phases: 3: Campus Av. & 14th St.





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 54 | 102 | 45 | 30 | 73 | 163 | 33 | 803 | 60 | 145 | 611 | 31 |
| Future Volume (veh/h) | 54 | 102 | 45 | 30 | 73 | 163 | 33 | 803 | 60 | 145 | 611 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.98 | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 | 1673 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 57 | 109 | 43 | 32 | 78 | 141 | 35 | 854 | 60 | 154 | 650 | 31 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 269 | 269 | 106 | 328 | 127 | 229 | 448 | 1695 | 119 | 363 | 1740 | 83 |
| Arrive On Green | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 |
| Sat Flow, veh/h | 1040 | 1203 | 475 | 1104 | 566 | 1022 | 679 | 3185 | 224 | 546 | 3271 | 156 |
| Grp Volume(v), veh/h | 57 | 0 | 152 | 32 | 0 | 219 | 35 | 451 | 463 | 154 | 334 | 347 |
| Grp Sat Flow(s),veh/h/ln | 1040 | 0 | 1677 | 1104 | 0 | 1588 | 679 | 1683 | 1726 | 546 | 1683 | 1744 |
| Q Serve(g_s), s | 2.3 | 0.0 | 3.4 | 1.1 | 0.0 | 5.4 | 1.4 | 7.4 | 7.4 | 10.9 | 5.0 | 5.0 |
| Cycle Q Clear(g_c), s | 7.7 | 0.0 | 3.4 | 4.5 | 0.0 | 5.4 | 6.4 | 7.4 | 7.4 | 18.3 | 5.0 | 5.0 |
| Prop In Lane | 1.00 | | 0.28 | 1.00 | | 0.64 | 1.00 | | 0.13 | 1.00 | | 0.09 |
| Lane Grp Cap(c), veh/h | 269 | 0 | 375 | 328 | 0 | 355 | 448 | 895 | 918 | 363 | 895 | 928 |
| V/C Ratio(X) | 0.21 | 0.00 | 0.40 | 0.10 | 0.00 | 0.62 | 0.08 | 0.50 | 0.50 | 0.42 | 0.37 | 0.37 |
| Avail Cap(c_a), veh/h | 588 | 0 | 889 | 666 | 0 | 842 | 500 | 1024 | 1050 | 405 | 1024 | 1061 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.6 | 0.0 | 14.4 | 16.3 | 0.0 | 15.2 | 7.8 | 6.5 | 6.5 | 12.4 | 5.9 | 5.9 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.7 | 0.1 | 0.0 | 1.7 | 0.1 | 0.4 | 0.4 | 0.8 | 0.3 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.5 | 0.0 | 1.1 | 0.3 | 0.0 | 1.9 | 0.1 | 1.5 | 1.6 | 1.0 | 1.0 | 1.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.0 | 0.0 | 15.1 | 16.4 | 0.0 | 16.9 | 7.9 | 6.9 | 6.9 | 13.1 | 6.2 | 6.2 |
| LnGrp LOS | B | A | B | B | A | B | A | A | A | B | A | A |
| Approach Vol, veh/h | | 209 | | | 251 | | | 949 | | | 835 | |
| Approach Delay, s/veh | | 16.1 | | | 16.8 | | | 7.0 | | | 7.5 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 28.5 | | 14.9 | | 28.5 | | 14.9 | | | | |
| Change Period (Y+Rc), s | | 5.4 | | 5.2 | | 5.4 | | 5.2 | | | | |
| Max Green Setting (Gmax), s | | 26.4 | | 23.0 | | 26.4 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 9.4 | | 9.7 | | 20.3 | | 7.4 | | | | |
| Green Ext Time (p_c), s | | 5.4 | | 0.8 | | 2.8 | | 1.3 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 9.1 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | ↑ | ↑ | | ↾ | |
| Traffic Vol, veh/h | 0 | 4 | 6 | 0 | 3 | 0 |
| Future Vol, veh/h | 0 | 4 | 6 | 0 | 3 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 4 | 7 | 0 | 3 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | - | 0 | 11 | 7 |
| Stage 1 | - | - | - | - | 7 | - |
| Stage 2 | - | - | - | - | 4 | - |
| Critical Hdwy | - | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | 1009 | 1075 |
| Stage 1 | 0 | - | - | 0 | 1016 | - |
| Stage 2 | 0 | - | - | 0 | 1019 | - |
| Platoon blocked, % | | - | - | | | |
| Mov Cap-1 Maneuver | - | - | - | - | 1009 | 1075 |
| Mov Cap-2 Maneuver | - | - | - | - | 1009 | - |
| Stage 1 | - | - | - | - | 1016 | - |
| Stage 2 | - | - | - | - | 1019 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s/v | 0 | 0 | 8.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBT | WBT | SBLn1 |
|---|---|---|---|
| Capacity (veh/h) | - | - | 1009 |
| HCM Lane V/C Ratio | - | - | 0.003 |
| HCM Control Delay (s/veh) | - | - | 8.6 |
| HCM Lane LOS | - | - | A |
| HCM 95th %tile Q (veh) | - | - | 0 |

# APPENDIX 5.3: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS FREEWAY TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | TRAFFIC CONDITIONS | | | 2025 WP |
|---|---|---|---|---|---|---|---|
| | | | | CALC | CS | DATE | 10/04/22 |
| Jurisdiction: | City of Upland | | | CHK | CS | DATE | 10/04/22 |
| Major Street: | 15th St. | | | Critical Approach Speed (Major) | | | 25 mph |
| Minor Street: | Coyote Run Dr.-West | | | Critical Approach Speed (Minor) | | | 25 mph |

Major Street Approach Lanes = **1** lane  Minor Street Approach Lanes **1** lane

Major Street Future ADT = **261** vpd  Minor Street Future ADT = **261** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

**URBAN (U)**

## (Based on Estimated Average Daily Traffic - See Note)

| URBAN | RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|---|
| XX | | | | | |
| **CONDITION A - Minimum Vehicular Volume** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **261** | *1* **261** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + | *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + | *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* | *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **261** | *1* **261** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + | *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + | *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* | *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. | | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| **A** | **B** | | | | |
| **3%** | **2%** | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

# Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

| DIST | CO | RTE | PM | TRAFFIC CONDITIONS | | 2025 WP |
|---|---|---|---|---|---|---|
| | | | | CALC CS | DATE | 10/04/22 |
| Jurisdiction: City of Upland | | | | CHK CS | DATE | 10/04/22 |
| Major Street: 15th St. | | | | Critical Approach Speed (Major) | | 25 mph |
| Minor Street: Coyote Run Dr.-East | | | | Critical Approach Speed (Minor) | | 25 mph |

Major Street Approach Lanes = 1 lane  Minor Street Approach Lanes 1 lane

Major Street Future ADT = 46 vpd  Minor Street Future ADT = 160 vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

**URBAN (U)**

## (Based on Estimated Average Daily Traffic - See Note)

| URBAN | RURAL | Minimum Requirements EADT | | | |
|---|---|---|---|---|---|
| XX | | | | | |
| **CONDITION A - Minimum Vehicular Volume** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **46** | *1* **160** | 8,000 | 5,600 | 2,400 | 1,680 |
| *2* + | *1* | 9,600 | 6,720 | 2,400 | 1,680 |
| *2* + | *2* + | 9,600 | 6,720 | 3,200 | 2,240 |
| *1* | *2* + | 8,000 | 5,600 | 3,200 | 2,240 |
| **CONDITION B - Interruption of Continuous Traffic** | | Vehicles Per Day on Major Street (Total of Both Approaches) | | Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) | |
| Satisfied | Not Satisfied | | | | |
| | XX | | | | |
| Number of lanes for moving traffic on each approach | | | | | |
| Major Street | Minor Street | Urban | Rural | Urban | Rural |
| *1* **46** | *1* **160** | 12,000 | 8,400 | 1,200 | 850 |
| *2* + | *1* | 14,400 | 10,080 | 1,200 | 850 |
| *2* + | *2* + | 14,400 | 10,080 | 1,600 | 1,120 |
| *1* | *2* + | 12,000 | 8,400 | 1,600 | 1,120 |
| **Combination of CONDITIONS A + B** | | | | | |
| Satisfied | Not Satisfied | | | | |
| | XX | 2 CONDITIONS 80% | | 2 CONDITIONS 80% | |
| No one condition satisfied, but following conditions fulfilled 80% of more ….. | **A** 1% **B** 0% | | | | |

**Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.**

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

# APPENDIX G-2

# VMT SCREENING EVALUATION

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July 20, 2022

Mr. Brian A. Bush
Diversified Pacific
10621 Civic Center Drive
Rancho Cucamonga, CA 91730

## VILLA SERENA VEHICLE MILES TRAVELED (VMT) SCREENING EVALUATION

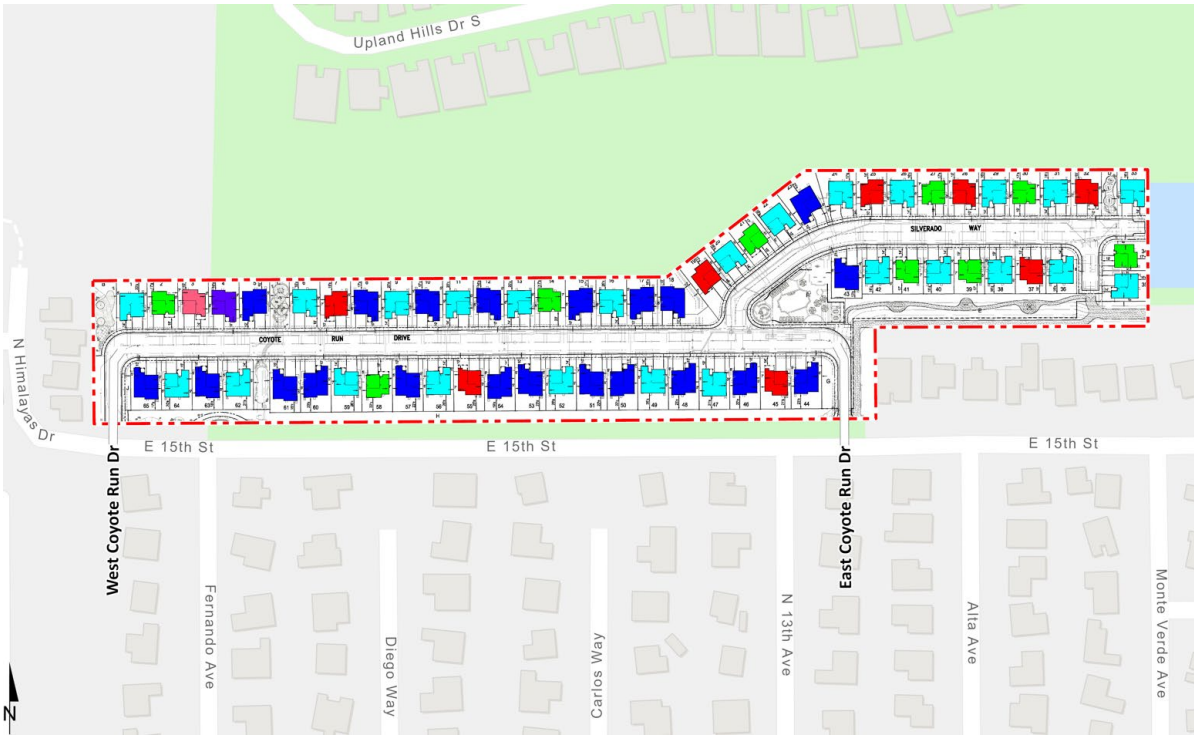
Mr. Brian A. Bush,

Urban Crossroads, Inc. is pleased to provide the following Vehicle Miles Traveled (VMT) Screening Evaluation for the Villa Serena development (**Project**) which is located northeast of Fernando Avenue and E 15th Street in the City of Upland.

## PROJECT OVERVIEW

It is our understanding that the project is to consist of 65 single family detached residential dwelling units. Preliminary site plan as shown below in Exhibit 1.

**EXHIBIT 1: PRELIMINARY SITE PLAN**



## BACKGROUND

Changes to California Environmental Quality Act (**CEQA**) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (**LOS**) as the measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (**OPR**) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**) (1). Based on the Technical Advisory, the City of Upland has developed and adopted their own VMT methodologies and thresholds, as documented in the City of Upland Traffic Impact Analysis Guidelines (**City Guidelines**) (2). This VMT screening evaluation has been developed based on the adopted City Guidelines.

## VMT SCREENING

The City Guidelines identify Projects that meet certain VMT screening criteria may be presumed to result in a less than significant transportation impact. It is our understanding the City of Upland utilizes the San Bernardino County Transportation Authority (**SBCTA**) VMT Screening Tool (**Screening Tool**). The Screening Tool allows users to select an assessor's parcel number (**APN**) to determine if a project's location meets one or more of the screening thresholds for land use projects identified in the City Guidelines. The City Guidelines lists the following VMT screening steps:

- Step 1: Transit Priority Area (TPA) Screening
- Step 2: Low VMT Area Screening
- Step 3: Project Type Screening

A land use project need only meet one of the above screening criteria to result in a less than significant impact.

## STEP 1: TPA SCREENING

Consistent with guidance identified in the City Guidelines, projects located within a Transit Priority Area (**TPA**) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (**FAR**) of less than 0.75;

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

The Screening Tool was utilized to locate the Project site and its proximity to a TPA. Results, as shown in Attachment A, identifies the Project Site is not located within ½ mile of an existing major transit stop or along a high-quality transit corridor.

**TPA screening criteria is not met.**

## STEP 2: LOW VMT AREA SCREENING

As noted in the City Guidelines, consistent with the Technical Advisory, "Residential and office projects that locate in areas with low VMT and that incorporate similar features (density, mix of uses, and transit accessibility) will tend to exhibit similarly low VMT."

The City Guidelines state that projects may be presumed to have a less than significant VMT impact if located in an already low VMT generating traffic analysis zones (**TAZs**) that generates a VMT per service population (**SP**) that is better than the City of Upland General Plan Buildout VMT per SP. The Screening Tool uses the sub-regional San Bernardino Transportation Analysis Model (**SBTAM**) to measure VMT performance within individual TAZ's within the region. The Project's physical location based on parcel number is selected in the Screening Tool to determine the TAZ in which the Project will reside. The Project's TAZs VMT per service population was compared to City's adopted threshold of 35.3 VMT per SP. The parcel containing the proposed Project was selected and the Screening Tool was run for origin-destination (**OD**) VMT per service population. The Project's TAZ 53656201 generates 31.4 VMT per SP, which is better than the City's adopted threshold Citywide average VMT per SP under buildout conditions. The Project is located within a low VMT generating zone (See Attachment A).

**Low VMT Area screening criteria is met.**

## STEP 3: PROJECT TYPE SCREENING

The City Guidelines identify that local serving retail less than 50,000 square feet or other local serving essential services (e.g., day care centers, public schools, medical/dental office buildings, etc.) are presumed to have a less than significant impact absent substantial evidence to the contrary. The Project, as intended, does not contain any local serving uses.

Additionally, the City Guidelines state that small projects generating fewer than 250 daily vehicle trips may be presumed to have a less than significant impact, subject to discretionary approval by the City. Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (**ITE**) Trip Generation Manual, 11th Edition, 2021 (4). A Project of this size is anticipated to generate 614 daily vehicle

trips. Therefore, the Project generates daily vehicle trips exceeding the 250 daily vehicle trip threshold (See Attachment B).

**Project Type screening criteria is not met.**

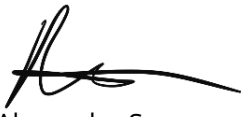
## CONCLUSION

In summary, the Project was found to meet Low VMT Area screening criteria. The Project's impact on VMT is presumed to be less than significant; no further VMT analysis required.

If you have any questions, please contact me directly at aso@urbanxroads.com.

Respectfully submitted,

URBAN CROSSROADS, INC.

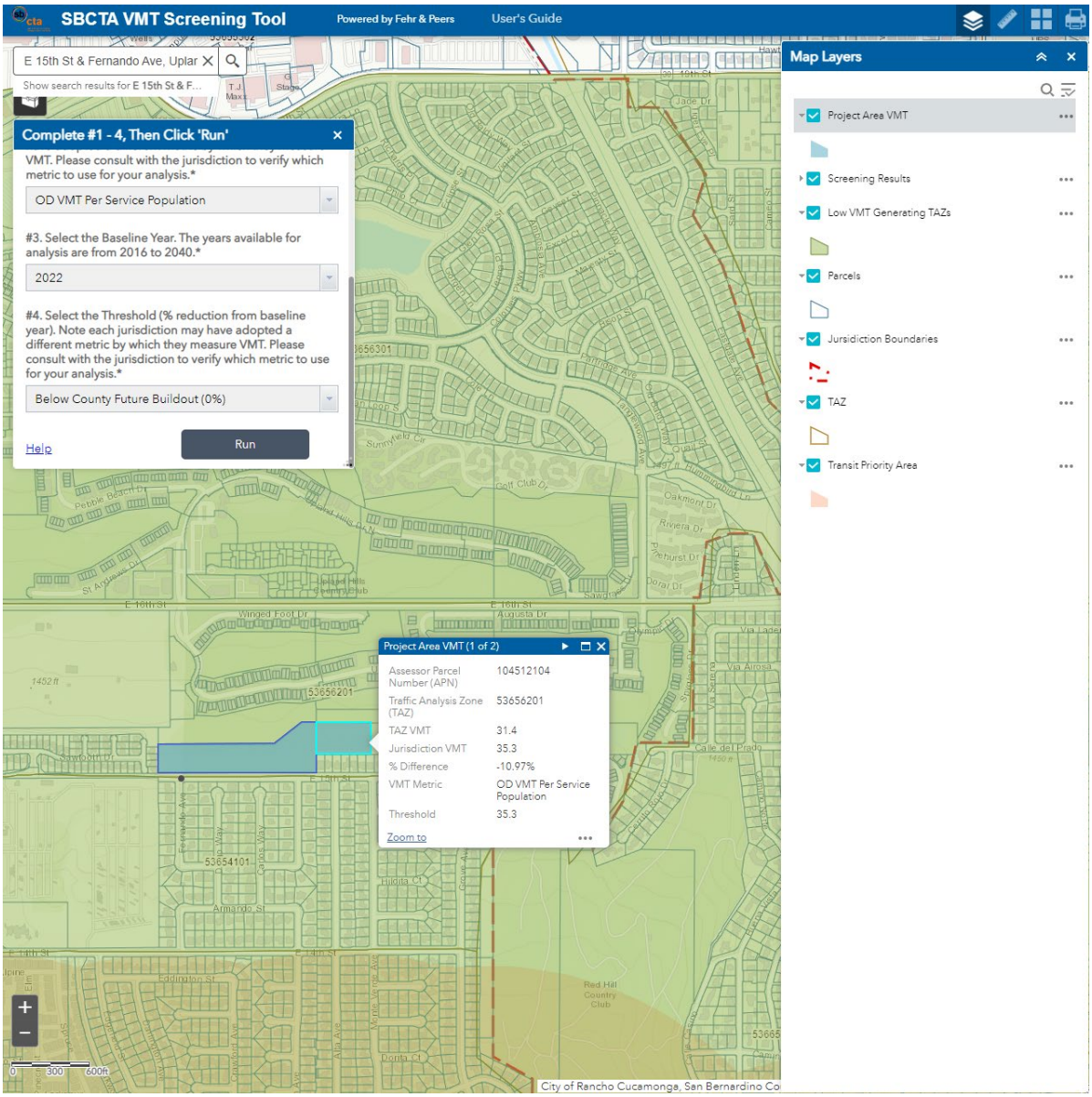


Alexander So
Senior Associate

## REFERENCES


1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
2. **City of Upland.** *Traffic Impact Analysis Guidlines.* July 2020.
3. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 2021.

# ATTACHMENT A
# SBCTA SCREENING TOOL


SBCTA VMT Screening Tool
Powered by Fehr & Peers
User's Guide
E 15th St & Fernando Ave, Uplar
Show search results for E 15th St & F...
Complete #1 - 4, Then Click 'Run'
VMT. Please consult with the jurisdiction to verify which metric to use for your analysis.*
OD VMT Per Service Population
#3. Select the Baseline Year. The years available for analysis are from 2016 to 2040.*
2022
#4. Select the Threshold (% reduction from baseline year). Note each jurisdiction may have adopted a different metric by which they measure VMT. Please consult with the jurisdiction to verify which metric to use for your analysis.*
Below County Future Buildout (0%)
Help
Run
Map Layers
Project Area VMT
Screening Results
Low VMT Generating TAZs
Parcels
Jurisdiction Boundaries
TAZ
Transit Priority Area
Project Area VMT (1 of 2)
Assessor Parcel Number (APN) 104512104
Traffic Analysis Zone (TAZ) 53656201
TAZ VMT 31.4
Jurisdiction VMT 35.3
% Difference -10.97%
VMT Metric OD VMT Per Service Population
Threshold 35.3
Zoom to
City of Rancho Cucamonga, San Bernardino Co

# ATTACHMENT B

# PROJECT TRIP GENERATION SUMMARY

## TABLE 1: PROJECT TRIP GENERATION SUMMARY

| Land Use[1] | ITE Code | Units[2] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Single Family Detached Residential | 210 | DU | 0.18 | 0.52 | 0.70 | 0.59 | 0.35 | 0.94 | 9.43 |

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

[2] DU = dwelling units

| Land Use | Quantity | Units[1] | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total | Daily |
|---|---|---|---|---|---|---|---|---|---|
| Lyon Avenue Project (TTM No. 38468) | 65 | DU | 12 | 34 | 46 | 38 | 23 | 61 | 614 |

[1] DU = dwelling units

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# APPENDIX H

# ARCHAEOLOGICAL SURVEY REPORT

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# Archaeological Resources Inventory Report for the Villa Serena Project

## San Bernardino County, California

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**March 2023**

## MANAGEMENT SUMMARY

The Colonies Partners, L.P. retained ECORP Consulting, Inc. in 2023 to conduct an updated cultural resources inventory for the Villa Serena Project (Project or Proposed Project) in San Bernardino County, California. Colonies Partners proposes to construct 65 single-family residential units across 23.21 acres of land north of east of Saint Elias Way, south of Upland Hills Drive South, west of Spyglass Drive, and north of (including portions of) East 15th Street, in the City of Upland, California.

The inventory included an updated records search, literature review, and field survey. The records search results indicated that 48 previous cultural resources studies have been conducted within 1 mile of the Project Area, of which two include portions of the Project Area. An additional report completed in 2018 that encompasses portions of the Project Area was supplied to ECORP but was not included as part of the CHRIS search. As a result of those studies, 37 sites have previously been recorded within 1 mile of the Project Area. Of those 37 sites, 9 are from the pre-contact period and associated with Native American culture, consisting of tool and processing remnants and lithic scatters, and 28 are from the historic period, consisting of early built structures including inns, restaurant adobes, and agriculture activities. None of these resources are located within the Project Area.

The field survey resulted in the observation of an existing detention basin that was constructed by 1967 but modified by 1985 to its current configuration. No archaeological resources were identified during the field survey. Recommendations for the management of unanticipated discoveries are provided.

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AB | Assembly Bill |
| ACHP | Advisory Council on Historic Preservation |
| APE | Area of Potential Effect |
| BP | Before Present |
| Caltrans | California Department of Transportation |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CHL | California Historical Landmarks |
| CHRIS | California Historical Resources Information System |
| CRHR | California Register of Historical Resources |
| DPR | Department of Parks and Recreation |
| MLD | Most Likely Descendant |
| NAHC | Native American Heritage Commission |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| OHP | California Office of Historic Preservation |
| PRC | Public Resources Code |
| Project | Villa Serena Project |
| RPA | Registered Professional Archaeologist |
| SCCIC | South Central Coastal Information Center |
| SHPO | State Historic Preservation Officer |
| TCR | Tribal Cultural Resource |
| USGS | United States Geological Survey |

# 1.0 INTRODUCTION

The Colonies Partners, L.P. retained ECORP Consulting, Inc. in 2023 to conduct an updated cultural resources inventory for the Villa Serena Project (Project or Proposed Project) in the City of Upland in San Bernardino County, California. A survey of the Project Area was required to identify potentially eligible cultural resources (i.e., archaeological sites and historic buildings, structures, and objects) that could be affected by the Project.

## 1.1 Project Location and Description

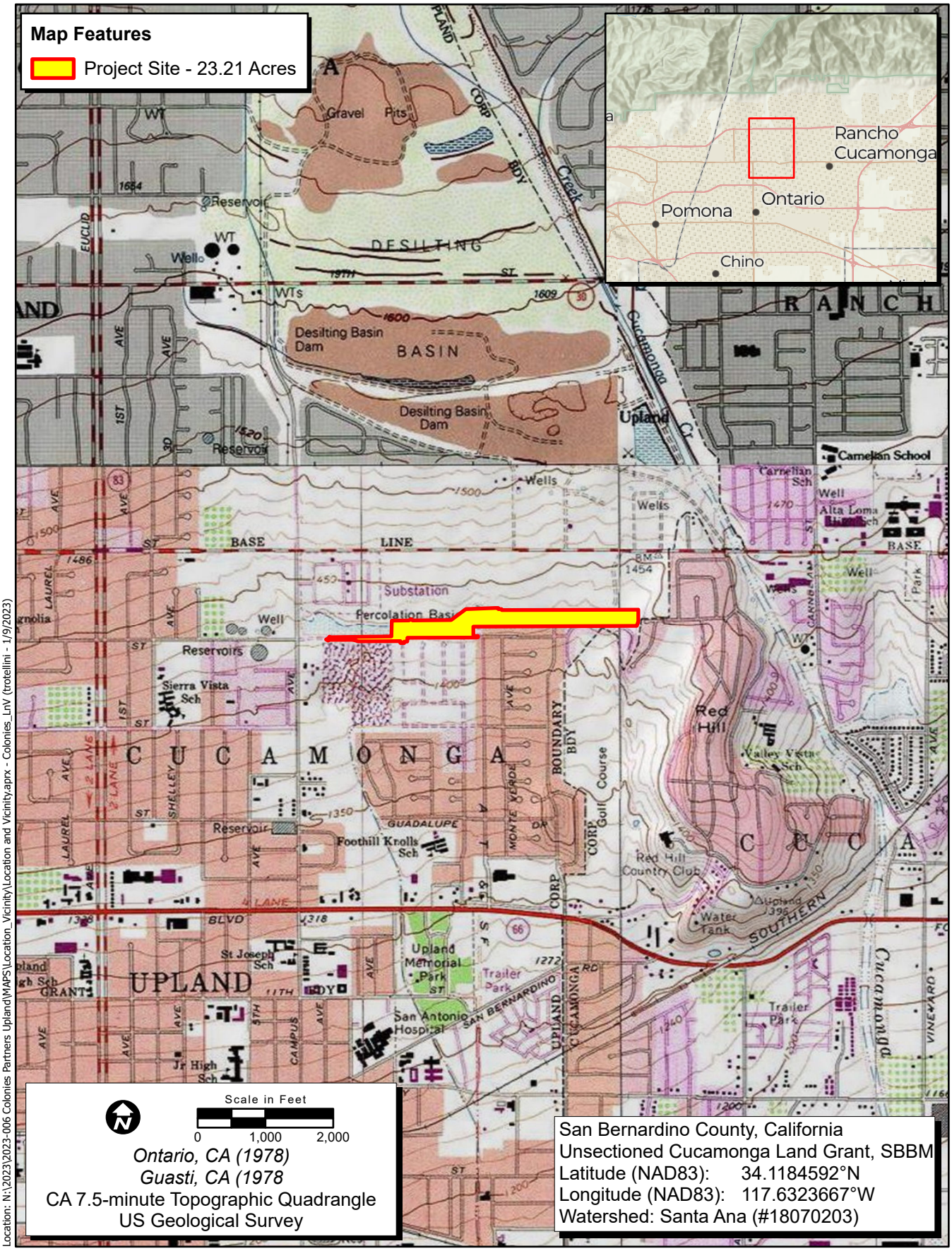
The Project Area consists of 23.21 acres of property located in an unsectioned portion of the Cucamonga Land Grant in Township 1 South, Range 7 West, San Bernardino Baseline and Meridian, as depicted on the 1967 (Photorevised 1981) Ontario, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (Figure 1). It is also known as Assessor Parcel Number 1045-121-04-0000. The Project Area is located east of Saint Elias Way, south of Upland Hills Drive South, west of Spyglass Drive, and north of (including portions of) East 15th Street, in the City of Upland, California.

The proposed Project entails the construction of 65 single family residential units and associated recreational space.

## 1.2 Area of Potential Effects

The Area of Potential Effects (APE) consists of the horizontal and vertical limits of a project and includes the area within which significant impacts or adverse effects to Historical Resources or Historic Properties could occur as a result of the project. The APE is defined for projects subject to regulations implementing Section 106 (federal law and regulations). For projects subject to the California Environmental Quality Act (CEQA) review, the term Project Area is used rather than APE. The terms Project Area and APE are interchangeable for the purpose of this document.

The horizontal APE consists of all areas where activities associated with a project are proposed and, in the case of this project, equals the Project Area subject to environmental review under the National Environmental Policy Act (NEPA) and CEQA. This includes areas proposed for construction, vegetation removal, grading, trenching, stockpiling, staging, paving, and other elements in the official Project description. The horizontal APE is illustrated in Figure 1 and represents the survey coverage area.




Location: N:\2023\2023-006 Colonies Partners Upland\MAPS\Location_Vicinity\Location and Vicinity.aprx - Colonies_LnV (trotellini - 1/9/2023)

Map Date: 1/9/2023
*Sources: ESRI, USGS*

**Figure 1. Project Location and Vicinity**

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2023-006 Villa Serena Project

The vertical APE is described as the maximum depth below the surface to which excavations for project foundations and facilities will extend. Therefore, the vertical APE for this project includes all subsurface areas where archaeological deposits could be affected. The vertical APE also is described as the maximum height of structures that could impact the physical integrity and integrity of setting of cultural resources, including districts and traditional cultural properties. For this project, the above-surface vertical APE is up to 50 feet above the surface. The subsurface vertical APE varies across the project, depending on foundation, leveling, compaction, trenching and other requirements for the residential units. In the event that any obstacles are encountered, ground disturbance of up to 15 feet below the surface will be necessary. It could extend as deep as 20 feet below the current surface, and therefore, a review of geologic and soils maps was necessary to determine the potential for buried archaeological sites that cannot be seen on the surface.

## 1.3 Regulatory Context

A review of the regulatory context is provided below; however, the inclusion of any of these laws and regulations in this report does not make a law or regulation apply when it otherwise would not. Similarly, the omission of any other laws and regulations from this section does not mean that they do not apply. Rather, the purpose of this section is to provide context in explaining why the study was carried out in the manner documented herein.

### 1.3.1 National Environmental Policy Act

NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." Cultural resources need not be determined eligible for the National Register of Historic Places (NRHP) through the National Historic Preservation Act (NHPA) of 1966 (as amended) to receive consideration under NEPA. NEPA is implemented by regulations of the Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500-1508).

The definition of *effects* in the NEPA regulations includes adverse and beneficial effects on historic and cultural resources (40 CFR 1508.8). Therefore, the *Environmental Consequences* section of an Environmental Impact Statement (see 40 CFR 1502.16(f)) must analyze potential effects to historic or cultural resources that could result from the proposed action and each alternative. In considering whether an alternative may "significantly affect the quality of the human environment," a federal agency must consider, among other things:

- Unique characteristics of the geographic area, such as proximity to historic or cultural resources (40 CFR 1508.27(b)(3)), and
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP (40 CFR 1508.27(b)(8)).

Therefore, because historic properties are a subset of *cultural resources*, they are one aspect of the *human environment* defined by NEPA regulations.

### 1.3.2 National Historic Preservation Act

The federal law that covers cultural resources that could be affected by federal undertakings is the NHPA of 1966, as amended. Section 106 of the NHPA requires that federal agencies take into account the effects of a federal undertaking on properties listed in or eligible for the NRHP. The agencies must afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the undertaking. A federal undertaking is defined in 36 CFR 800.16(y):

> A federal undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval.

The regulations that stipulate the procedures for complying with Section 106 are in 36 CFR 800. The Section 106 regulations require:

- definition of the APE;
- identification of cultural resources within the APE;
- evaluation of the identified resources in the APE using NRHP eligibility criteria;
- determination of whether the effects of the undertaking or project on eligible resources will be adverse; and
- agreement on and implementation of efforts to resolve adverse effects, if necessary.

The federal agency must seek comment from the State Historic Preservation Officer (SHPO) and, in some cases, the ACHP, for its determinations of eligibility, effects, and proposed mitigation measures. Section 106 procedures for a specific project can be modified by negotiation of a Memorandum of Agreement or Programmatic Agreement between the federal agency, the SHPO, and, in some cases, the project proponent.

Effects to a cultural resource are potentially adverse if the lead federal agency, with the SHPO's concurrence, determines the resource eligible for the NRHP, making it a Historic Property, and if application of the Criteria of Adverse Effects (36 CFR 800.5[a][2] et seq.) results in the conclusion that the effects will be adverse. The NRHP eligibility criteria, contained in 36 CFR 63, are as follows:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess aspects of integrity of location, design, setting, materials, workmanship, feeling, association, and
>
> A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory.

In addition, the resource must be at least 50 years old, barring exceptional circumstances (36 CFR 60.4). Resources that are eligible for, or listed on, the NRHP are *historic properties*.

Regulations implementing Section 106 of the NHPA (36 CFR 800.5) require that the federal agency, in consultation with the SHPO, apply the Criteria of Adverse Effect to historic properties within the APE. According to 36 CFR 800.5(a)(1):

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association.

### 1.3.3 California Environmental Quality Act

CEQA is the state law that applies to a project's impacts on cultural resources. A project is an activity that may cause a direct or indirect physical change in the environment and that is undertaken or funded by a state or local agency, or requires a permit, license, or lease from a state or local agency. CEQA requires that impacts to Historical Resources be identified and, if the impacts will be significant, then apply mitigation measures to reduce the impacts.

A Historical Resource is a resource that 1) is listed in or has been determined eligible for listing in the California Register of Historical Resources (CRHR) by the State Historical Resources Commission, or has been determined historically significant by the CEQA lead agency because it meets the eligibility criteria for the CRHR, 2) is included in a local register of historical resources, as defined in Public Resources Code (PRC) 5020.1(k), or 3), and has been identified as significant in a historical resources survey, as defined in PRC 5024.1(g) (California Code of Regulations [CCR] Title 14, Section 15064.5(a)).

The eligibility criteria for the CRHR are as follows (CCR Title 14, Section 4852(b)):

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

(2) It is associated with the lives of persons important to local, California, or national history;

(3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition, the resource must retain integrity, which is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association (CCR Title 14, Section 4852(c)). Resources that have been determined eligible for the NRHP are automatically eligible for the CRHR.

Impacts to a Historical Resource, as defined by CEQA (listed in an official historic inventory or survey or eligible for the CRHR), are significant if the resource is demolished or destroyed or if the characteristics that made the resource eligible are materially impaired (CCR Title 14, Section 15064.5(b)). Demolition or alteration of eligible buildings, structures, and features that they would no longer be eligible would result in a significant impact. Whole or partial destruction of eligible archaeological sites would result in a significant impact. In addition to impacts from construction resulting in destruction or physical alteration of an eligible resource, impacts to the integrity of setting (sometimes termed *visual impacts*) of physical features in the Project Area could also result in significant impacts.

Tribal Cultural Resources (TCRs) are defined in Section 21074 of the California PRC as sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are either included in or determined to be eligible for inclusion in the CRHR, or are included in a local register of historical resources as defined in subdivision (k) of Section 5020.1, or are a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. Section 1(b)(4) of Assembly Bill (AB) 52 established that only California Native American tribes, as defined in Section 21073 of the California PRC, are experts in the identification of TCRs and impacts thereto. Because ECORP does not meet the definition of a California Native American tribe, it only addresses information in this report for which it is qualified to identify and evaluate, and that which is needed to inform the cultural resources section of CEQA documents. This report, therefore, does not identify or evaluate TCRs. Should California Native American tribes ascribe additional importance to or interpretation of archaeological resources described herein, or provide information about non-archeological TCRs, that information is documented separately in the AB 52 tribal consultation record between the tribe(s) and lead agency and summarized in the TCRs section of the CEQA document, if applicable.

## 1.4 Report Organization

The following report documents the study and its findings and was prepared in conformance with the California Office of Historic Preservation's (OHP) *Archaeological Resource Management Reports: Recommended Contents and Format*. Appendix A includes a confirmation of the records search with the California Historical Resources Information System (CHRIS) and historical society coordination. Appendix B contains documentation of a search of the Sacred Lands File. Appendix C presents photographs of the Project Area.

# 2.0 SETTING

## 2.1 Environmental Setting

The Project Area is approximately 1,430 feet above mean sea level and is located south of the base of the San Gabriel Mountains. The Project Area is a mostly flat strip of vacant land oriented east–west that slopes down to the south. A housing complex is immediately to the south and a golf course to the north.

The soils in the Project Area consist of mostly Soboba stony loamy sand, 2 to 9 percent slopes. Less than two percent of the Project Area consists of Soboba gravelly loamy sand, 0 to 9 percent slopes. Both are excessively drained alluvium derived from granite. There exists the potential for buried pre-contact archaeological sites in the Project Area due to the presence of alluvium within the Project Area; however, the heavily disturbed nature of the Project Area suggests that the potential is low.

The dominant plant community within the Project Area includes the floating primrose-willow, hackberries, and American black nightshade. Wildlife species that may occur in the Project Area include the fox squirrel and the western fence lizard.

# 3.0 CULTURAL CONTEXT

## 3.1 Regional Pre-Contact History

### 3.1.1 Paleo-Indian Period/Terminal Pleistocene (12,000 to 10,000 BP)

The first inhabitants of southern California were big game hunters and gatherers exploiting extinct species of Pleistocene megafauna (e.g., mammoth and other Rancholabrean fauna). Local fluted point assemblages comprised large spear points or knives are stylistically and technologically similar to the Clovis Paleo-Indian cultural tradition dated to this period elsewhere in North America (Moratto 1984). Archaeological evidence for this period in southern California is limited to a few small temporary camps with fluted points found around late Pleistocene lake margins in the Mojave Desert and around Tulare Lake in the southern San Joaquin Valley. Single points are reported from Ocotillo Wells and Cuyamaca Pass in eastern San Diego County and from the Yuha Desert in Imperial County (Rondeau et al. 2007).

### 3.1.2 Early Archaic Period/Early Holocene (10,000 to 8,500 BP)

Approximately 10,000 years ago, at the beginning of the Holocene, warming temperatures, and the extinction of the megafauna resulted in changing subsistence strategies with an emphasis hunting smaller game and increasing reliance on plant gathering. Previously, Early Holocene sites were represented by only a few sites and isolates from the Lake Mojave and San Dieguito complexes found along former lakebeds and grasslands of the Mojave Desert and in inland San Diego County. More recently, southern California Early Holocene sites have been found along the Santa Barbara Channel (Erlandson 1994), in western Riverside County (Goldberg 2001; Grenda 1997), and along the San Diego County coast (Gallegos 1991; Koerper et al. 1991; Warren 1967).

The San Dieguito Complex was defined based on material found at the Harris site (CA-SDI-149) on the San Dieguito River near Lake Hodges in San Diego County. San Dieguito artifacts include large leaf-shaped points; leaf-shaped knives; large ovoid, domed, and rectangular end and side scrapers; engraving tools; and crescentics (Koerper et al. 1991). The San Dieguito Complex at the Harris site dates to 9,000 to 7,500 Before Present (BP) (Gallegos 1991). However, sites from this time period in coastal San Diego County have yielded artifacts and subsistence remains characteristic of the succeeding Encinitas Tradition, including manos, metates, core-cobble tools, and marine shell (Gallegos 1991; Koerper et al. 1991).

### 3.1.3 Encinitas Tradition or Milling Stone Period/Middle Holocene (8,500 to 1,250 BP)

The Encinitas Tradition (Warren 1968) and the Milling Stone Period (Wallace 1955) refer to a long period of time during which small mobile bands of people who spoke an early Hokan language foraged for a wide variety of resources including hard seeds, berries, and roots/tubers (yucca in inland areas), rabbits and other small animals, and shellfish and fish in coastal areas. Sites from the Encinitas Tradition consist of residential bases and resource acquisition locations with no evidence for overnight stays. Residential bases have hearths and fire-affected rock indicating overnight stays and food preparation. Residential bases along the coast have large amounts of shell and are often termed shell middens.

The Encinitas Tradition as originally defined (Warren 1968) applied to all of the non-desert areas of southern California. Recently, four patterns within the Encinitas Tradition have been proposed which apply to different regions of southern California (Sutton and Gardner 2010). The Topanga Pattern includes archaeological material from the Los Angeles Basin and Orange County. The Greven Knoll Pattern pertains to southwestern San Bernardino County and western Riverside County (Sutton and Gardner 2010). Each of the patterns is divided into temporal phases. The Topanga Pattern included the Los Angeles Basin and Orange County. The Topanga I phase extends from 8,500 to 5,000 BP and Topanga II runs from 5,000 to 3,500 BP. The Topanga Pattern ended about 3,500 BP with the arrival of Takic speakers, except in the Santa Monica Mountains where the Topanga III phase lasted until about 2,000 BP.

The Encinitas Tradition in inland areas east of the Topanga Pattern (southwestern San Bernardino County and western Riverside County) is the Greven Knoll Pattern (Sutton and Gardner 2010). Greven Knoll I (9,400 to 4,000 BP) has abundant manos and metates. Projectile points are few and are mostly Pinto points. Greven Knoll II (4,000 to 3,000 BP) has abundant manos and metates and core tools. Projectile points are mostly Elko points. The Elsinore site on the east shore of Lake Elsinore was occupied during Greven Knoll I and Greven Knoll II. During Greven Knoll I faunal processing (butchering) took place at the lakeshore and floral processing (seed grinding), cooking, and eating took place farther from the shore. The primary foods were rabbit meat and seeds from grasses, sage, and ragweed. A few deer, waterfowl, and reptiles were consumed. The recovered archaeological material suggests that a highly mobile population visited the site at a specific time each year. It is possible that their seasonal round included the ocean coast at other times of the year. These people had an unspecialized technology as exemplified by the numerous crescents, a multi-purpose tool. The few projectile points suggest that most of the small game was trapped using nets and snares (Grenda 1997:279). During Greven Knoll II, which included a warmer drier climatic episode known as the Altithermal, it is thought that populations in interior southern California concentrated at oases and that Lake Elsinore was one of them. The Elsinore site (CA-RIV-2798)

is one of five known Middle Holocene residential sites around Lake Elsinore. Tools were mostly manos, metates, and hammerstones. Scraper planes were absent. Flaked-stone tools consisted mostly of utilized flakes used as scrapers. The Elsinore site during the Middle Holocene was a *recurrent extended encampment*, which could have been occupied during much of the year.

The Encinitas Tradition lasted longer in inland areas because Takic speakers did not move east into these areas until circa 1,000 BP. Greven Knoll III (3,000 to 1,000 BP) is present at the Liberty Grove site in Cucamonga (Salls 1983) and at sites in Cajon Pass that were defined as part of the Sayles Complex (Kowta 1969). Greven Knoll III sites have a large proportion of manos and metates and core tools as well as scraper planes. Kowta (1969) suggested the scraper planes may have been used to process yucca and agave. The faunal assemblage consists of large quantities of lagomorphs (rabbits and hares) and lesser quantities of deer, rodents, birds, carnivores, and reptiles.

### 3.1.4 Palomar Tradition (1,250 to 150 BP)

The native people of southern California (north of a line from Agua Hedionda to Lake Henshaw in San Diego County) spoke Takic languages which form a branch or subfamily of the Uto-Aztecan language family. The Takic languages are divided into the Gabrielino-Fernandeño language, the Serrano-Kitanemuk group (the Serrano [includes the Vanyume dialect] and Kitanemuk languages), the Tataviam language, and the Cupan group (the Luiseño-Juaneño language, the Cahuilla Language, and the Cupeño language) (Golla 2011). According to Sutton (2009), Takic speakers occupied the southern San Joaquin Valley before 3,500 BP. Perhaps as a result of the arrival of Yokutsan speakers (a language in the Penutian language family) from the north, Takic speakers moved southeast. The ancestors of the Kitanemuk moved into the Tehachapi Mountains and the ancestors of the Tataviam moved into the upper Santa Clara River drainage. The ancestors of the Gabrielino (Tongva) moved into the Los Angeles Basin about 3,500 BP, replacing the native Hokan speakers. Speakers of proto-Gabrielino reached the southern Channel Islands by 3,200 BP (Sutton 2009) and moved as far south as Aliso Creek in Orange County by 3,000 BP.

Takic people moved south into southern Orange County after 1,250 BP and became the ancestors of the Juaneño. Takic people moved inland from southern Orange County about 1,000 BP, becoming the ancestors of the Luiseño, Cupeño, and Cahuilla. Takic people from the Kitanemuk area moved east along the northern slopes of the San Gabriel Mountains and spread into the San Bernardino Mountains and along the Mojave River becoming the ancestors of the Serrano and the Vanyume.

The material culture of the inland areas where Takic languages were spoken at the time of Spanish contact is part of the Palomar Tradition (Sutton 2011). San Luis Rey I Phase (1,000 to 500 BP) and San Luis Rey II Phase (500 to 150 BP) pertain to the area occupied by the Luiseño at the time of Spanish contact. The Peninsular I (1,000 to 750 BP), II (750 to 300 BP), and III (300 to 150 BP) Phases are used in the areas occupied by the Cahuilla and Serrano (Sutton 2011).

San Luis Rey I is characterized by Cottonwood Triangular arrow points, use of bedrock mortars, stone pendants, shell beads, quartz crystals, and bone tools. San Luis Rey II sees the addition of ceramics, including ceramic cremation urns, red pictographs on boulders in village sites, and steatite arrow straighteners. San Luis Rey II represents the archaeological manifestation of the antecedents of the historically known Luiseño (Goldberg 2001). During San Luis Rey I there were a series of small permanent

residential bases at water sources, each occupied by a kin group (probably a lineage). During San Luis Rey II people from several related residential bases moved into a large village located at the most reliable water source (Waugh 1986). Each village had a territory that included acorn harvesting camps at higher elevations. Villages have numerous bedrock mortars, large dense midden areas with a full range of flaked and ground stone tools, rock art, and a cemetery.

## 3.2 Local Pre-Contact History

The native people of southern California (north of a line from Agua Hedionda to Lake Henshaw in San Diego County) spoke Takic languages which form a branch or subfamily of the Uto-Aztecan language family. The Takic languages are divided into the Gabrielino-Fernandeño language, the Serrano-Kitanemuk group (the Serrano [includes the Vanyume or Desert Serrano dialect] and Kitanemuk languages), the Tataviam language, and the Cupan group (the Luiseño-Juaneño language, the Cahuilla Language, and the Cupeño language) (Golla 2011). According to Sutton (2009), Takic speakers occupied the southern San Joaquin Valley before 3,500 BP. Perhaps as a result of the arrival of Yokutsan speakers (a language in the Penutian language family) from the north, Takic speakers moved southeast. The ancestors of the Kitanemuk moved into the Tehachapi Mountains and the ancestors of the Tataviam moved into the upper Santa Clara River drainage. The ancestors of the Gabrielino (Tongva) moved into the Los Angeles Basin about 3,500 BP replacing the native Hokan speakers. Speakers of proto-Gabrielino reached the southern Channel Islands by 3,200 BP (Sutton 2009).

The material culture of the ancestors of the Gabrielino is termed the Del Rey Tradition (3,500 to 150 BP) (Sutton 2010). With the arrival of the Takic speakers, settlement and subsistence systems changed. Mobility was greatly decreased compared to the Encinitas Tradition and small groups of related people lived in semi-permanent residential bases near a water source. Subsistence changed from a mobile foraging pattern to a collector pattern (Binford 1980). People collected resources and brought them back to the residential base. When away from the residential base people stayed overnight in temporary camps.

Six phases have been defined on the mainland (Angeles I – Angeles VI) and four phases (Island I – Island IV) have been defined on the southern Channel Islands for the Del Rey Tradition (Sutton 2010). Angeles I, II, and III (3,500 to 1,250 BP) correspond with the Intermediate Horizon first defined by Wallace (1955). During this period mortars and pestles were first used which probably indicates the beginning of acorn exploitation. Acorns required greater processing time but were storable and contributed to a greater degree of sedentism. Lithic technology was more focused on making flake tools, rather than core tools, as in the previous Encinitas Tradition. Large projectile points, including Elko points, indicate that hunting was probably still accomplished with the *atlatl* or spear thrower.

Angeles IV, V, and VI (1,250 to 150 BP) correspond with the Late Prehistoric Horizon as originally defined by Wallace (1955). The complex hunter-gatherer cultures encountered by the Spaniards in southern California developed during the Late Prehistoric Period. People lived in villages of up to 250 people located near permanent water and a variety of food sources. Each village was typically located at the center of a defended territory from which resources for the group were gathered. Small groups left the village for short periods of time to hunt, fish, and gather plant foods. While away from the village, they

established temporary camps and created locations where food and other materials were processed. Archaeologically, such locations are evidenced by manos and metates for seed grinding, bedrock mortars for acorn pulverizing, and lithic scatters indicating manufacturing or maintenance of stone tools (usually made of chert) used in hunting or butchering. Overnight stays in field camps are evidenced by fire-affected rock used in hearths.

The beginning of Angeles IV is marked by the introduction of the bow and arrow, which made deer hunting more efficient. The bow and arrow was also used in wars for territorial defense. One of the most important food resources for inland groups was acorns gathered from oak groves in canyons, drainages, and foothills. Acorn processing was labor intensive, requiring grinding in a mortar and leaching with water to remove tannic acid (Basgall 1987). Many of the mortars are bedrock mortars. Seeds from sage and grasses, goosefoot, and California buckwheat were collected and ground into meal with manos and metates. Seeds were used as the storable staple in areas which lacked acorn-producing oak groves. Protein was supplied through the meat of deer, rabbits, and other animals, hunted with bow and arrow or trapped using snares, nets, and deadfalls. On the coast fish were obtained using shell fishhooks and nets.

Trade among local groups and inland and coastal groups was important as a means of obtaining resources from outside the local group's territory. Items traded over long distances included obsidian from the Obsidian Butte source in Imperial County and from the Coso source in Inyo County, steatite bowls and ornaments from Catalina Island, shell beads and ornaments from the Santa Barbara Channel area, rabbit skins and deer hides from the interior, and dried fish and shellfish from the coast. Acorns, seeds, and other food resources were probably exchanged locally.

## 3.3 Ethnography

Ethnographic accounts of Native Americans indicate that the Gabrieliño (also known as Gabrieleno, or Tongva) once occupied the region that encompasses the Project Area. At the time of contact with Europeans, the Gabrieliño were the main occupants of the southern Channel Islands, the Los Angeles Basin, much of Orange County, and extended as far east as the western San Bernardino Valley. The term Gabrieliño came from the group's association with Mission San Gabriel Arcángel, established in 1771. The Gabrieliño are believed to have been one of the most populous and wealthy Native American tribes in southern California prior to European contact. (Bean and Smith 1978; McCawley 1996; Moratto 1984) and spoke a Takic language. The Takic group of languages is part of the Uto-Aztecan language family.

The Gabrieliño occupied villages located along rivers and at the mouths of canyons. Populations ranged from 50 to 200 inhabitants. Residential structures within the villages were domed, circular, and made from thatched tule or other available wood. Gabrieliño society was organized by kinship groups, with each group composed of several related families who together owned hunting and gathering territories. Settlement patterns varied according to the availability of floral and faunal resources (Bean and Smith 1978; McCawley 1996; Miller 1991).

Vegetal staples consisted of acorns, chia, seeds, piñon nuts, sage, cacti, roots, and bulbs. Animals hunted included deer, antelope, coyote, rabbits, squirrels, rodents, birds, and snakes. The Gabrieliño also fished and collected marine shellfish (Bean and Smith 1978; McCawley 1996; Miller 1991). By the late 18th century, Gabrieliño population had significantly dwindled due to introduced European diseases and

dietary deficiencies. Gabrieliño communities disintegrated as families were taken to the missions (Bean and Smith 1978; McCawley 1996; Miller 1991). However, current descendants of the Gabrieliño are preserving Gabrieliño culture.

## 3.4 Regional History

Spanish colonization of California began with the Portola Expedition of 1769 during which presidios (forts) and missions were established. The missions were established near the coast beginning with San Diego in 1769 and ending with the missions established in San Rafael and Sonoma in 1823 (Castillo 1978). The purpose of the missions was to convert and control the Native American population. Mission San Gabriel Archangel was founded in 1771 east of what is now Los Angeles in Gabrielino territory. An asistencia or outpost of the San Gabriel Mission, known as the San Bernardino Rancho Asistencia, was founded in 1819 in Serrano territory near present-day Redlands.

After Mexico became independent from Spain in the early 1830s, the Mexican government closed the missions. Former mission lands were granted to soldiers and other Mexican citizens for use as cattle ranches. The San Bernardino land grant was south of the Project Area and included what are now the towns of San Bernardino and Redlands. It was granted to Jose del Carmen Lugo, Jose Maria Lugo, Vicente Lugo, and Diego Sepulveda in 1842 (Aviña 1976:91).

The American period began when the Treaty of Guadalupe Hidalgo was signed between Mexico and the United States in 1848, ending the Mexican-American War. As a result of the treaty, California became part of the United States. The rapid increase in population resulting from the Gold Rush of 1849 allowed California to become a state in 1850. In 1851, the Lugos sold a portion of the San Bernardino land grant to 500 Mormon settlers from Salt Lake City who founded the town of San Bernardino. After only 5 years, most of the Mormons returned to Salt Lake City (California Genealogy 2008). San Bernardino County was formed from Los Angeles County in 1853 and San Bernardino became the county seat (Gudde 1969:280).

## 3.5 History of Upland

In 1881, George Chaffey created the Etiwanda Irrigation company. By 1882, he had expanded his business to cover other areas of the former Ranch Cucamonga land grant. Upland was originally part of Chaffey's planned community called Ontario (Upland Heritage 2023). That same year, after some successful land speculation and having successfully founded the precursor of the Los Angeles Department of Water and Power, George Chaffey purchased 8,000 acres from the Cucamonga Rancho, developing what would eventually become the city of Ontario. In the process, he constructed Euclid Avenue, and a trolley line, which went to the area now known as Upland (Upland Public Library n.d.).

In 1892, mule-driven street cars pulled trolleys up an 8-mile-long track on a hill, this was later replaced by an electric trolley. By 19222 gasoline motor trucks were running the trolleys in the area (Popular Science 1922). In 1887, the AT&SF railroad selected their route through Upland. The Bedford Brothers built the Upland Railway station on Second Avenue. Numerous fruit packing houses soon sprang up nearby as well. Farms and houses near the railway station sprang up, as it allowed workers to commute to Los Angeles, or to ship their produce to large markets in Los Angeles (Upland Heritage 2023).

In 1888, Having created the Ontario Fruit Exchange, local resident Charles D. Adams created a new citrus association. Because fruit grown at higher elevations tended to be of better quality, he called the new association "Upland," marking the first time the area was thus designated (Upland Public Library n.d.b).

The City of Ontario incorporated in 1891, as 0.5 square mile. In 1902, when nearby cities also began to seek incorporation, Ontario attempted to annex a 10-square-mile area, which would cover the Upland railroad station, all the Upland railroad tracks, and the Upland post office. San Bernardino Board of Supervisors held a two-day hearing, deciding that a vote of incorporation for Upland should be undertaken before Ontario was allowed to expand. A vote was held, and Upland was incorporated on May 15, 1906 (Upland Heritage 2023). In 1935 the land originally claimed for annexation by Ontario was annexed by Upland (Upland Heritage 2023).

# 4.0 METHODS

## 4.1 Personnel Qualifications

Registered Professional Archaeologist (RPA) Sonia Sifuentes, who meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historical archaeology, supervised this cultural resource investigation. Associate Archaeologist Julian Acuña, RPA conducted the fieldwork. Associate Archaeologist Evelyn Hildebrand, RPA prepared the technical report. Lisa Westwood, RPA provided technical report review and quality assurance.

Sonia Sifuentes, RPA is a Senior Archaeologist with more than 15 years of experience in cultural resources management, primarily in Southern California. Ms. Sifuentes holds an M.S. in Archaeology of the North and meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historic archaeology. She has participated in and supervised numerous surveys, test programs, data recovery excavations, and construction monitoring compliance for both prehistoric and historical sites; and has cataloged, identified, and curated thousands of artifacts. She has conducted evaluations of cultural resources for eligibility for the NRHP and CRHR. Ms. Sifuentes is experienced in the organization and execution of field projects in compliance with Section 106 of the NHPA and CEQA. She has contributed to and authored numerous cultural resources technical reports, research designs, and cultural resources management plans.

Julian Acuña, RPA is an Associate Archaeologist with more than 6 years of experience in cultural resources management. Mr. Acuña holds an M.A. in Applied Archaeology and a B.A. Cum Laude in Anthropology. He meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historic archaeology. He has participated in various aspects of archaeological fieldwork including survey, test excavations, construction monitoring, the recording of both pre-contact and historic-period archaeological sites, and laboratory work for the analysis and cataloging of artifacts from multi-component sites.

Evelyn Hildebrand, RPA is an Associate Archaeologist with more than 5 years of experience working in cultural resource management across Southern California. She holds a B.A. in Anthropology with a focused curriculum in archaeology and an M.A. in Applied Archaeology. Ms. Hildebrand meets the

Secretary of the Interior's Professional Qualifications Standards for prehistoric and historic archaeology and has participated in various aspects of archaeological fieldwork including survey, test excavation, data recovery, artifact analysis, construction monitoring, both as an archaeological monitor and field lead, and the recording and recovery of pre-contact and historic-period archaeological sites. She has also worked with Egypt's department of Antiquities in collaboration with the Wadi el-Hudi expedition in 2019 in the desert southeast of Aswan, Egypt using photogrammetry to record and create digital 3D models of sites.

Lisa Westwood, RPA has 27 years of experience and meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric and historical archaeology. She holds a B.A. in Anthropology and an M.A. in Anthropology (Archaeology). She is the Director of Cultural Resources for ECORP.

## 4.2 Records Search Methods

ECORP conducted a records search for the property at the South Central Coastal Information Center (SCCIC) of the CHRIS at California State University, Fullerton on February 6, 2023 (Appendix A). The purpose of the records search was to determine the extent of previous surveys within a 1-mile (1,600-meter) radius of the Proposed Project location, and whether previously documented pre-contact or historic archaeological sites, architectural resources, or traditional cultural properties exist within this area.

In addition to the official records and maps for archaeological sites and surveys in San Bernardino County, the following historic references were also reviewed: Built Environment Resource Directory (OHP 2020); Historic Property Data File for San Bernardino County (OHP 2012); the National Register Information System (National Park Service [NPS] 2023); Office of Historic Preservation, California Historical Landmarks (CHL; OHP 2022); CHL (OHP 1996 and updates); California Points of Historical Interest (OHP 1992 and updates); Directory of Properties in the Historical Resources Inventory (OHP 1999); Caltrans Local Bridge Survey (California Department of Transportation [Caltrans] 2019); Caltrans State Bridge Survey (Caltrans 2018); and *Historic Spots in California* (Kyle 2002).

Other references examined include a RealQuest Property Search and historic General Land Office land patent records (Bureau of Land Management 2023). Historic maps reviewed include:

- 1897 USGS Cucamonga, California topographic quadrangle map (1:1,000 scale);
- 1942 USGS Ontario and Vicinity, California topographic quadrangle map (1:31,680 scale);
- 1954 USGS Ontario, California topographic quadrangle map (1:24,000 scale); and
- 1967 USGS Ontario, California topographic quadrangle map (1:24,000 scale).

ECORP reviewed historic aerial photographs taken in 1938, 1948, 1959, 1966, 1978, 1985, 1994, and 2010 for any indications of property usage and built environment.

## 4.3 Sacred Lands File Coordination Methods

In addition to the records search, ECORP contacted the California Native American Heritage Commission (NAHC) on January 30, 2023 to request a search of the Sacred Lands File for the Project Area (Appendix B). This search determines whether California Native American tribes within the Project Area have recorded

Sacred Lands, because the Sacred Lands File is populated by members of the Native American community with knowledge about the locations of tribal resources. In requesting a search of the Sacred Lands File, ECORP solicited information from the Native American community regarding TCRs, but the responsibility to formally consult with the Native American community lies exclusively with the federal and local agencies under applicable state and federal laws. The lead agencies do not delegate government-to-government authority to any private entity to conduct tribal consultation.

## 4.4 Other Interested Party Consultation Methods

ECORP mailed letters to the Upland Heritage Society on January 9, 2023 to solicit comments or obtain historical information that the repository might have regarding events, people, or resources of historical significance in the area (Appendix A).

## 4.5 Field Methods

ECORP subjected the APE to an intensive pedestrian survey on February 14, 2023 under the guidance of the *Secretary of the Interior's Standards for the Identification of Historic Properties* (NPS 1983) using 15-meter transects. ECORP expended 1 person-day in the field. ECORP examined the ground surface for indications of surface or subsurface cultural resources and inspected the general morphological characteristics of the ground surface for indications of subsurface deposits that may be manifested on the surface, such as circular depressions or ditches. Whenever possible, ECORP examined the locations of subsurface exposures caused by such factors as rodent activity, water or soil erosion, or vegetation disturbances for artifacts or for indications of buried deposits. ECORP did not conduct subsurface investigations or artifact collections during the pedestrian survey.

Standard professional practice requires that all cultural resources encountered during the survey be recorded using Department of Parks and Recreation (DPR) 523-series forms approved by the California OHP. The resources are usually photographed, mapped using a handheld Global Positioning System receiver, and sketched as necessary to document their presence using appropriate DPR forms.

# 5.0 RESULTS

## 5.1 Records Search

The records search consisted of a review of previous research and literature, records on file with the SCCIC for previously recorded resources, and historical aerial photographs and maps of the vicinity.

### 5.1.1 Previous Research

Forty-nine previous cultural resource investigations have been conducted within 1 mile of the property, covering approximately 80 percent of the total area surrounding the property within the records search radius (Appendix A). Of the 49 studies, three overlap with the Project Area (Table 1). One of these reports, completed in 2018 by Garfinkel and Landa, was provided separately from the CHRIS search. Appendix A provides a list of the reports located within 1 mile of the Project Area, in addition to the 2018 report provided ECORP which was not included in the CHRIS results. These studies revealed the presence of pre-

contact sites, including lithic scatters and habitation sites, and historical sites, including lithic scatters and sites associated with historic early buildings and agriculture activities. The previous studies were conducted between 1973 and 2018 and vary in size from 8 to 180 acres.

**Table 1. Previous Cultural Studies within the Project Area**

| Report Number | Author(s) | Report Title | Year |
|---|---|---|---|
| SB-00702 | Archaeological Associates | Archaeological Survey Report: Ultrasystems Project #4426 | 1978 |
| SB-06667 | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga, Upland and Ontario, San Bernardino County, California | 2009 |
| NA | Garfinkel & Landa | Phase I Cultural Resources Assessment for A proposed commercial development on 10-Acre site in the city of Upland, San Bernardino County, California | 2018 |

The results of the records search indicate that approximately 80 percent of the Project Area has been previously surveyed for cultural resources; however, these studies were conducted in smaller segments, at different times, by different consultants, and as many as 45 years ago under obsolete standards. Therefore, ECORP conducted a pedestrian survey of the Project Area for the Project under current protocols.

The records search also determined that 37 previously recorded pre-contact and historic-era cultural resources are located within 1 mile of the Project Area. Of these, nine are believed to be associated with Native American occupation of the vicinity, and 28 are historic-era sites, associated with early buildings and structures including adobes, inns and restaurants, and citrus agriculture and early roads. There are no previously recorded cultural resources within the Project Area.

### 5.1.2 Records

The OHP's Built Environment Resource Directory for San Bernardino County (dated March 3, 2020) listed two properties within 1 mile of the Project Area (OHP 2020). None are within the Project Area.

The National Register Information System (NPS 2023) failed to reveal any eligible or listed properties within the Project Area. The nearest National Register properties are located 2 miles northwest of the Project Area in the City of Upland, California. None are within the Project Area.

ECORP reviewed resources listed as *California Historical Landmarks* (OHP 1996) by the OHP (2022) on February 13, 2023. The nearest listed landmark is #1028: the Madonna of the Trail in California (plaque located 1.25 miles southwest of the Project Area). None are within the Project Area.

A review of *Historic Spots in California* (Kyle 2002) mentions four trails that once crossed what is now Euclid Avenue, which is a long tree-lined drive that extends north and south through the modern cities of

Ontario and Upland. It also mentions the Madonna of the Trail, which is now a monument. None are within the Project Area.

A RealQuest online property search for Assessor Parcel Number 1045-121-04-0000 revealed the property consists of 9.13 acres of vacant land. No other property history information was on record with RealQuest.

The Caltrans Bridge Local Inventory (Caltrans 2019) listed one historic-period bridge within 1 mile of the Project Area. Local bridge #54C0222, named Cucamonga Creek Channel, is located 0.72 mile northeast of the Project Area. It was constructed in 1973 and was evaluated by Caltrans as a Category 5 bridge, not eligible for the NRHP under Criterion C. The State Inventory (Caltrans 2018) did not list any historic bridges within 1 mile of the Project Area.

### 5.1.3 Map Review and Aerial Photographs

The review of historical aerial photographs and maps of the Project Area provides information on the past land uses of the property and potential for buried archaeological sites. This information shows the property was left vacant and unused. Following is a summary of the review of historical maps and photographs.

- The 1897 USGS Cucamonga, California topographic quadrangle map (1:1,000 scale) depicts the Project Area as vacant land with no development surrounding it.
- 1942 USGS Ontario and Vicinity, California topographic quadrangle map (1:31,680 scale) depicts the Project Area as vacant land on a hillside with a downward north-to-south slope and undeveloped land around it.
- 1954 USGS Ontario, California topographic quadrangle map (1:24,000 scale) depicts the Project Area as it is depicted in the 1942 map: vacant land on a slope with undeveloped land around it.
- 1967 USGS Ontario, California topographic quadrangle map (1:24,000 scale) depicts the Project Area as a percolation basin with development to the southeast.
- Aerial photographs from 1938 and 1948 show the Project Area as mostly vacant land with sparse vegetation. Dirt roads are visible running in east–west directions across the western side of the Project Area without a pond. A cluster of trees is in the southeast portion of the Project Area and a square grid of unknown crops is in the northeastern portion.
- Aerial photographs from 1959 and 1966 show housing development to the south of the Project Area, while the project area remains undeveloped as in the previous photographs.
- Aerial photographs from 1978 and 1980 show additional housing development south of the Project Area and further west than in previous photographs. The Project Area remains unchanged.
- The aerial photograph from 1985 shows the Project Area has been modified to its current percolation basin configuration. Housing and road development are visible to the north of the Project Area.

- The aerial photographs from 1994, 2002, 2005, and 2010 show the Project Area in its current state as a percolation basin and cleared land that stretches east to west.

In sum, the property has been undeveloped and vacant from at least 1897 to between 1954 and 1967. After 1954, the property had been modified into a percolation basin, and that the housing development was constructed to the north of the Project Area. Later, the Project Area modified into its current green space landscaped design between 1980 and 1985.

## 5.2 Sacred Lands File Results

A search of the Sacred Lands File by the NAHC resulted in a negative indication for the presence of Native American cultural resources in the Project Area. A record of all correspondence is provided in Appendix B.

## 5.3 Other Interested Party Consultation Results

ECORP has not received any responses to the letters sent to the Upland Heritage Historical Society as of the date of the preparation of this document.

## 5.4 Field Survey Results

ECORP surveyed the Project Area for cultural resources on February 14, 2023. Ground conditions were poor to fair and visibility ranged from 5 to 75 percent (Figures 2 and 3). Most of the Project Area was covered with vegetation, with the densest areas on the slopes of the southern access road/embankment and along the northern Project boundary (Figure 4). ECORP observed the presence of the percolation basin as configured in the 1985 aerial photograph. The bottom of the percolation basin is relatively flat, covered in low vegetation, and portions have standing water (Figure 3); three modern drainages are located on the northern and eastern boundaries.

ECORP did not observe archaeological resources during the survey. Project Area conditions appear unchanged since the 2018 survey conducted by Garfinkle and Landa.



**Figure 2. APE Overview (view north; February 14, 2023).**



**Figure 3. APE Overview (view west; February 14, 2023).**



**Figure 4. 15th Street (view southwest; February 14, 2023).**

# 6.0 MANAGEMENT CONSIDERATIONS

## 6.1 Conclusions

ECORP did not identify any archaeological resources within the Project Area as a result of the records search and field survey. Until the lead agencies concur with the identification and evaluation of eligibility of cultural resources, no Project activity should occur.

## 6.2 Likelihood for Subsurface Cultural Resources

Due to the amount of heavy disturbance within the Project Area caused by the construction of the basin, and due to the negative survey results, there exists a low potential for buried pre-contact archaeological sites in the Project Area.

## 6.3 Post-Review Discoveries

There always remains the potential for ground-disturbing activities to expose previously unrecorded cultural resources. Both CEQA and Section 106 of the NHPA require the lead agency to address any unanticipated cultural resource discoveries during Project construction. Therefore, ECORP recommends the lead agency adopt and implement the following mitigation measures to reduce potential adverse impacts to Less than Significant:

- If subsurface deposits believed to be cultural or human in origin are discovered during construction, all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgment. The following notifications shall apply, depending on the nature of the find:
    - If the professional archaeologist determines that the find does not represent a cultural resource, work may resume immediately and no agency notifications are required.
    - If the professional archaeologist determines that the find does represent a cultural resource from any time period or cultural affiliation, the archaeologist shall immediately notify the lead agencies. The agencies shall consult on a finding of eligibility and implement appropriate treatment measures, if the find is determined to be a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines or a historic property under Section 106 NHPA, if applicable. Work may not resume within the no-work radius until the lead agencies, through consultation as appropriate, determine that the site either: 1) is not a Historical Resource under CEQA or a Historic Property under Section 106; or 2) that the treatment measures have been completed to their satisfaction.
    - If the find includes human remains, or remains that are potentially human, they shall ensure reasonable protection measures are taken to protect the discovery from disturbance (AB 2641). The archaeologist shall notify the San Bernardino County Coroner (per Section 7050.5

of the Health and Safety Code). The provisions of Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the California PRC, and AB 2641 will be implemented. If the coroner determines the remains are Native American and not the result of a crime scene, the coroner will notify the NAHC, which then will designate a Native American Most Likely Descendant (MLD) for the Project (Section 5097.98 of the PRC). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the PRC). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the PRC). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the county in which the property is located (AB 2641). Work may not resume within the no-work radius until the lead agencies, through consultation as appropriate, determine that the treatment measures have been completed to their satisfaction.

The Lead Agency is responsible for ensuring compliance with these mitigation measures. Section 15097 of Title 14, Chapter 3, Article 7 of CEQA, *Mitigation Monitoring or Reporting*, "The public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects. A public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity which accepts the delegation; however, until mitigation measures have been completed the lead agency remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program."

## 7.0 REFERENCES CITED


Aviña, Rose H. 1976. *Spanish and Mexican Land Grants in California*. Arno Press, New York.

Basgall, Mark E. 1987. Resource Intensification Among Hunter-Gatherers: Acorn Economies in Prehistoric California. Research in Economic Anthropology 9:21-52.

Bean, Lowell J. and Charles R. Smith. 1978. Gabrielino. In *Handbook of North American Indians, Volume 8, California,* edited by R. F. Heizer, pp. 538-549. Smithsonian Institution, Washington, D.C.

Binford, Lewis R. 1980 "Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation." *American Antiquity*, vol. 45, no. 1, 1980, pp. 4–20.

Bureau of Land Management. 2023. Bureau of Land Management, General Land Office Records, Records Automation website. http://www.glorecords.blm.gov/. Accessed February 13, 2023.

California Department of Transportation (Caltrans). 2019. Structure and Maintenance & Investigations, Historical Significance–Local Agency Bridges Database.

_____. 2019. Structure and Maintenance & Investigations, Historical Significance–State Agency Bridges Database 2019.

California Genealogy. 2008. San Bernardino City History, California Genealogy. http://www.californiagenealogy.org/sanbernardino/san_bernardino_city_history.htm. Accessed February 13, 2023.

Castillo, Edward D. 1978. The Impact of Euro-American Exploration and Settlement. In *Handbook of North American Indians, Volume 8, California*, edited by R. F. Heizer, pp. 99-127. Smithsonian Institution, Washington D.C.

Erlandson, J. M. 1994. *Early Hunter-Gatherers of the California Coast*. Plenum Press, New York.

Gallegos, D. 1991. Antiquity and Adaptation at Agua Hedionda, Carlsbad, California. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J. M. Erlandson and R. H. Colten, pp. 19-41. Perspectives in California Archaeology, Volume 1. Institute of Archaeology, University of California, Los Angeles.

Goldberg, S. 2001. *Eastside Reservoir Project: Final Report of Archaeological Investigations* (Five volumes). Applied Earthworks, Inc., Hemet, California.

Golla, V. 2011. *California Indian Languages*. University of California Press, Berkeley.

Grenda, D. R. 1997. *Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore: Archaeological Investigations at a Stratified Site in Southern California*. Statistical Research Technical Series No 59. Statistical Research, Inc., Tucson, Arizona.

Gudde, Erwin G. 1969. *California Place Names: The Origin and Etymology of Current Geographical Names.* Third Edition. University of California, Berkeley.

Koerper, H. C., P. Langenwalter II, and A. Schroth. 1991. Early Holocene Adaptations and the Transition Problem: Evidence from the Allan O. Kelly Site, Agua Hedionda Lagoon. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J. M. Erlandson and R. H. Colten, pp. 81-88. Perspectives in California Archaeology, Volume 1. Institute of Archaeology, University of California, Los Angeles.

Kowta 1969. The Sayles Complex. A Late Milling Stone Assemblage from Cajon Pass and the Ecological Implications of Its Scraper Planes. University of California Press.

Kyle, Douglas. 2002. *Historic Spots in California*. Stanford University Press. Stanford, California.

McCawley, William. 1996. *The First Angelinos: the Gabrielino Indians of Los Angeles*. Malki Museum Press, Ballena Press, Banning, California.

Miller, Bruce W. 1991. *The Gabrielino*. Sand River Press, Los Osos, California.

Moratto, M. J. 1984. *California Archaeology*. Academic Press, Orlando.

National Park Service (NPS). 2023. National Register of Historic Places, Digital Archive on NPGallery. https://npgallery.nps.gov/NRHP. Accessed February 13, 2023.

_____. 1983. *Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines*. 48 Federal Register 44716-68.

Office of Historic Preservation (OHP). 2022. *Office of Historic Preservation California Historical Landmarks Website*. http://ohp.parks.ca.gov/?page_id=21387. Accessed February 13, 2023.

_____. 2020. Office of Historic Preservation's Built Environment Resource Directory, dated March 3, 2020 for San Bernardino County.

_____. 2012. Directory of Properties in the Historic Property Data File for San Bernardino County.

_____. 1999. Directory of Properties in the Historical Resources Inventory.

_____. 1996. California Historical Landmarks. California Department of Parks and Recreation, Sacramento, California.

_____. 1992. California Points of Historical Interest. California Department of Parks and Recreation, Sacramento, California.

Popular Science. October 1922. From Mule to Motor Bus on Street Car Tracks. *Popular Science*, October 1922. https://books.google.com/books?id=bioDAAAAMBAJ&pg=PA61#v=onepage&q&f=false.

Rondeau, M. F., J. Cassidy, and T. L. Jones. 2007. Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/Microblade Complex. In *California Prehistory: Colonization, Culture, and Complexity*, edited by T. L. Jones and K. A. Klar, pp. 299-315. Altamira Press, Lanham, Maryland.

Salls, R. A. 1983. The Liberty Grove Site: Archaeological Interpretation of a Late Milling Stone Horizon Site on the Cucamonga Plain. M.A. thesis, University of California, Los Angeles.

Sutton, M. Q. 2011. The Palomar Tradition and Its Place in the Prehistory of Southern California. *Pacific Coast Archaeological Society Quarterly* 44(4):1-74.

_____. 2010. The Del Rey Tradition and Its Place in the Prehistory of Southern California. Pacific Coast Archaeological Society Quarterly 44(2):1-54.

_____. 2009. People and Language: Defining the Takic Expansion into Southern California. *Pacific Coast Archaeological Society Quarterly* 41(2 and 3):31-93.

Sutton, M. Q. and J. K. Gardner. 2010. Reconceptualizing the Encinitas Tradition of Southern California. *Pacific Coast Archaeological Society Quarterly* 42(4):1-64.

Upland Heritage. 2023. History of Early Upland, https://uplandheritage.org/early-upland. Accessed February 13, 2023.

Upland Public Library. n.d.a. History of Ontario, CA. http://uplandpubliclibrary.blogspot.com/p/history-of-ontario-ca.html. Accessed February 13, 2023.

Upland Public Library. n.d.b. History of Upland, CA. http://uplandpubliclibrary.blogspot.com/p/history-of-upland-ca.html. Accessed February 13, 2023.

Wallace, W. J. 1955. A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11:214-230.

Warren, C. N. 1968. Cultural Tradition and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States*, edited by Cynthia Irwin-Williams, pp. 1-14. Eastern New Mexico University Contributions in Anthropology 1. Portales, New Mexico.

_____. 1967. The San Dieguito Complex: a Review and Hypothesis. *American Antiquity* 32:168-185.

Waugh, M. G. 1986. Intensification and Land-Use: Archaeological Indication of Transition and Transformation in a Late Prehistoric Complex in Southern California. Ph.D. diss., University of California, Davis.

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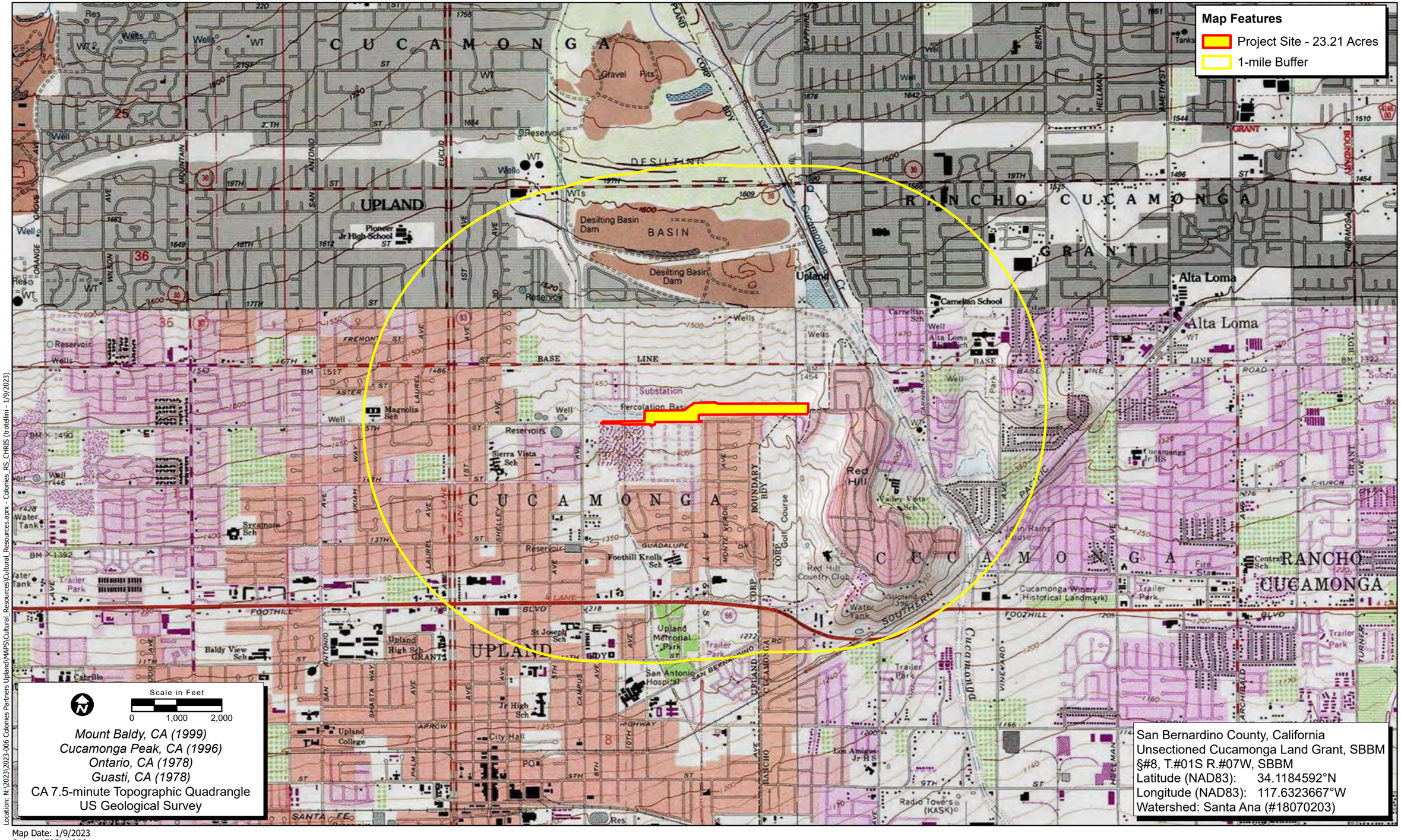
Appendix A – Records Search Confirmation and Historical Society Coordination

Appendix B – Sacred Lands File Coordination

Appendix C – Project Area Photographs

# APPENDIX A

Records Search Confirmation and Historical Society Coordination




Location: N:\2023\2023-006 Colonies Partners Upland\MAPS\Cultural_Resources\Cultural_Resources.aprx - Colonies_RS_CHRIS (trotellini - 1/9/2023)

Map Date: 1/9/2023
*Sources: ESRI, USGS*

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

**Records Search**

2023-006 Colonies Partners Upland

# Report List

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| SB-00171 | NADB-R - 1060171; Voided - 73-7.6 | 1973 | SIMPSON, RUTH and BETTY MOORE | ENVIRONMENTAL IMPACT REPORT: PROPOSED P.U.D., 4 UNITS/ACRE, CUCAMONGA (85-79), RED HILL CONDOMINIUM SITE | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | |
| SB-00178 | NADB-R - 1060178; Voided - 73-8.5 | 1973 | SMITH, GERALD A. | RESOURCE EVALUATION OF SITES WITHIN CUCAMONGA CREEK DEBRIS BASIN | SAN BERNARDINO COUNTY MUSEUM | 36-000270, 36-001593, 36-001607 |
| SB-00194 | NADB-R - 1060194; Voided - 73-12.3 | 1973 | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | ENVIRONMENTAL IMPACT SURVEY: RED HILL GREEN TRACT #8884 | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | |
| SB-00203 | NADB-R - 1060203; Voided - 74-0.2D | 1974 | ARCHER, MORSE G. | CASA DE RANCHO CUCAMONGA | | |
| SB-00265 | NADB-R - 1060265; Voided - 75-10.1 | 1975 | WEAVER, RICHARD A. | ENVIRONMENTAL IMPACT EVALUATION: ARCHAEOLOGY OF PROPOSED ADDITIONS AND IMPROVEMENTS IN CUCAMONGA COUNTY WATER DISTRICT | ARCHAEOLOGICAL RESEARCH UNIT, UCR | |
| SB-00276 | NADB-R - 1060276; Voided - 75-12.3 | 1975 | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | ENVIRONMENTAL IMPACT ANALYSIS, ARCHAEOLOGICAL VALUES, THE LAND DEVELOPING FIRM OF CROWELL AND LEVANTHAL, TRACT 9157 - CUCAMONGA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | 36-000902 |
| SB-00302 | NADB-R - 1060302; Voided - 76-2.4 | 1976 | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | ENVIRONMENTAL IMPACT ANALYSIS: ARCHAEOLOGICAL VALUES, FIRM OF LAKEWOOD ENGINEERING, TRACTS 9167 AND 9193 - CUCAMONGA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | 36-000901 |
| SB-00316 | NADB-R - 1060316; Voided - 76-4.1 | 1976 | HARRIS, RUTH D. | ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT, TRACTS 9193 AND 9262, CUCAMONGA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | 36-000901 |
| SB-00318 | NADB-R - 1060318; Voided - 76-4.2A | 1982 | ALLEN, LAWRENCE P. | THE CHAFFEY HILLSIDE SITE, CA-SBR-895; REPORT ON THE CULTURAL RESOURCE MITIGATION PROGRAM | ARCHAEOLOGICAL RESOURCE MANAGEMENT CORPORATION | 36-000895 |
| SB-00433 | NADB-R - 1060433; Voided - 76-11.3 | 1976 | HEARN, JOSEPH E. | ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF TENTATIVE TRACT 9589 LOCATED ON RED HILL IN CUCAMONGA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | |
| SB-00545 | NADB-R - 1060545; Voided - 77-8.15 | 1977 | HEARN, JOSEPH E. | ARCHAEOLOGICAL - HISTORICAL RESOURCES EVALUATION OF VINEYARD PARK PROJECT, ALTA LOMA AREA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | |

## Report List

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| SB-00606 | NADB-R - 1060606; Voided - 78-2.1 | 1978 | HEARN, JOSEPH E. | ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF A PORTION OF LOT 1, CUCAMONGA VINEYARD TRACT SUBDIVISION "C"; ALTA LOMA AREA OF RANCHO CUCAMONGA | SAN BERNARDINO COUNTY MUSEUM ASSOCIATION | 36-000902 |
| SB-00642 | NADB-R - 1060642; Voided - 78-5.3A | 1977 | WEAVER, RICHARD A. | ARCHAEOLOGICAL IMPACT EVALUATION: TEST EXCAVATION AT BASE LINE - CARNELIAN STREET TO VINEYARD AVENUE, SAN BERNARDINO COUNTY, CALIFORNIA | ARCHAEOLOGICAL RESEARCH UNIT, UCR | 36-000901, 36-000902 |
| SB-00643 | NADB-R - 1060643; Voided - 78-5.3B | 1978 | LIPP, DONALD | ARCHAEOLOGICAL IMPACT EVALUATION: TEST EXCAVATIONS AT SBR-902, RANCHO CUCAMONGA, SAN BERNARDINO COUNTY, CALIFORNIA | ARCHAEOLOGICAL RESEARCH UNIT, UCR | 36-000902 |
| SB-00702 | NADB-R - 1060702; Voided - 78-11.5 | 1978 | ARCHAEOLOGICAL ASSOCIATES | ARCHAEOLOGICAL SURVEY REPORT: ULTRASYSTEMS PROJECT #4426 | ARCHAEOLOGICAL ASSOCIATES | |
| SB-00806 | NADB-R - 1060806; Voided - 79-7.1 | 1979 | WILMOTH, STAN | ENVIRONMENTAL IMPACT EVALUATION: AN ARCHAEOLOGICAL ASSESSMENT OF BOTH SIDES OF SIXTEENTH STREET (BASELINE) IN THE CITY OF UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA | ARCHAEOLOGICAL RESEARCH UNIT, UCR | |
| SB-01595 | NADB-R - 1061595; Voided - 86-10.3 | 1986 | BISSELL, RONALD M. | CULTURAL RESOURCES ASSESSMENT OF PROPOSED CONSTRUCTION OF CAMPUS AVENUE BETWEEN 19TH STREET AND 22ND STREET, CITY OF UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA | | |
| SB-01660 | NADB-R - 1061660; Voided - 87-3.14 | 1987 | GROSS, LORRAINE S., KEVIN J. PETER, and WILLIAM B. GILMOUR | CULTURAL AND PALEONTOLOGICAL RESOURCE INVESTIGATIONS OF THE LAKES AT SAN ANTONIO PROJECT, CITY OF UPLAND, SAN BERNARDINO COUNTY, CALIFORNIA | SCIENTIFIC RESOURCE SURVEYS | |
| SB-02059 | NADB-R - 1062059; Voided - 90-1.6 | 1990 | INFOTEC RESEARCH | COMPENDIUM OF RESULTS OF OBSIDIAN STUDIES FOR STUDY AREA SITES: APPENDIX TO PREHISTORIC SITES IN THE PRADO BASIN, CALIFORNIA: REGIONAL CONTEXT AND SIGNIFICANCE EVALUATION | INFOTEC | 36-000270, 36-000895, 36-000901, 36-001000, 36-001543, 36-003690, 36-004032, 36-005245 |
| SB-02070 | NADB-R - 1062070; Voided - 90-2.3 | 1990 | RECTOR, CAROL | REPORT ON TRIP TO RAINS HOUSE | | |

# Report List

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| SB-02086 | NADB-R - 1062086; Voided - 90-5.4 | 1990 | DEL CHARIO, KATHLEEN C. | AN ARCHAEOLOGICAL ASSESSMENT OF THE SYCAMORE VILLAGE PROJECT SITE, RANCHO CUCAMONGA, SAN BERNARDINO COUNTY | ARCHAEOLOGICAL RESOURCE MANAGEMENT CORP. | |
| SB-02101 | NADB-R - 1062101; Voided - 90-5.5 | 1990 | VAN WORMER, STEPHEN R. | AN HISTORICAL ASSESSMENT OF THE SYCAMORE VILLAGE PROJECT SITE, RANCHO CUCAMONGA, SAN BERNARDINO COUNTY | ARCHAEOLOGICAL RESOURCE MANAGEMENT CORP. | |
| SB-02266 | NADB-R - 1062266; Voided - 91-0.1 | 1991 | DONNELLY, CORDY | REVISION AND DISCOVERY IN A MILLING STONE HORIZON CONTEXT | Pomona College | 36-000342, 36-000421, 36-000713, 36-000895, 36-000901, 36-001543, 36-005243 |
| SB-02290 | NADB-R - 1062290; Voided - 91-2.16 | 1991 | HATHEWAY, ROGER G. and JOHN F. ROMANI | PRELIMINARY HISTORIC PROPERTY SURVEY REPORT FOR THE PROPOSED WIDENING OF FOOTHILL BOULEVARD BETWEEN GROVE AVENUE AND LION STREET, IN THE CITY OF RANCHO CUCAMONGA, SAN BERNARDINO COUNTY | HATHEWAY AND ASSOCIATES | |
| SB-02293 | NADB-R - 1062293; Voided - 85-0.4 | 1985 | SALLS, ROY A. | THE SCRAPER PLANE: A FUNCTIONAL INTERPRETATION | JOURNAL OF FIELD ARCHAEOLOGY 12 (1):99-106 | 36-000901 |
| SB-02294 | NADB-R - 1062294; Voided - 90-0.6 | 1990 | SALLS, ROY A. | CONCERNING WILLIAM FOLAN'S SCRAPER PLANES | JOURNAL OF FIELD ARCHAEOLOGY 17 (2):245-245 | 36-000901 |
| SB-02444 | NADB-R - 1062444; Voided - 91-8.1 | 1991 | MCALLISTER, BERNICE LYONS | PROVENIENCE LOG FOR THE SBCM HA1 ASSEMBLAGE | CHAFFEY COLLEGE, SOCIAL SCIENCE DIVISION | |
| SB-02537 | NADB-R - 1062537; Voided - 88-0.10 | 1988 | SALLS, ROY A. | OBSIDIAN DATING OF THE LIBERTY GROVE SITE WITH IMPLICATIONS FOR SASSON AND CHAFFEY HILLSIDE ARCHAEOLOGICAL SITES | | 36-000895, 36-000901 |
| SB-02561 | NADB-R - 1062561; Voided - 83-4.14 | 1983 | SALLS, ROY | THE LIBERTY GROVE SITE: ARCHAEOLOGICAL INTERPRETATIONS OF A LATE MILLINGSTONE SITE ON THE CUCAMONGA PLAIN | | 36-000901 |
| SB-02763 | NADB-R - 1062763 | 1993 | ALEXANDROWICZ, J. STEPHEN, ANNE DUFFIELD-STOLL, and SUSAN R. ALEXANDROWICZ | URBAN HISTORIC ARCHAEOLOGICAL AND ARCHITECTURAL INVESTIGATIONS AT FOOTHILL BLVD. & VINEYARD AVE., CITY OF RANCHO CUCAMONGA, COUNTY OF SAN BERNARDINO, CA | ARCHAEOLOGICAL CONSULTING SERVICES | 36-007351, 36-007395, 36-007396, 36-007397, 36-007398 |

## Report List

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| SB-02940 | NADB-R - 1062940 | 1993 | ARCHAEOLOGICAL ASSOCIATES | HISTORICAL PROPERTY SURVEY REPORT FOR THE PROPOSED WIDENING OF FOOTHILL BLVD., BETWEEN GROVE AVE AND LION ST., IN THE CITY OF RANCHO CUCAMONGA, SAN BERNARDINO COUNTY, CALIFORNIA | ARCHAEOLOGICAL ASSOCIATES | 36-000897 |
| SB-03082 | NADB-R - 1063082 | 1976 | IRVINE, KENNETH C. | FAUNAL ANALYSIS OF 4 EXCAVATION UNITS AT SBCM-133 | | 36-000270 |
| SB-03567 | NADB-R - 1063567 | 2001 | JENSEN, PETER | ARCHAEOLOGICAL INVENTORY SURVEY OF SB54XC412 CELL TOWER SITE, UPLAND MEMORIAL PARK, CITY OF UPLAND, CA. 9PP | JENSEN & ASSOCIATES | |
| SB-03568 | NADB-R - 1063568 | 1979 | KING, L.D. | EUCLID AVE. TRAFFIC IMPROVEMENT PROJECT M-5083 INFORMATIONAL REPORT ON EFFECTS SEC 106-HISTORIC PRESERVATION ACT. 75PP | | 36-002910, 36-018222, 36-018593, 36-018594, 36-018596, 36-018598, 36-018600, 36-018602, 36-018603, 36-018604 |
| SB-03571 | NADB-R - 1063571 | 2000 | LAPIN, PHILLIPE | CULTURAL RESOURCE ASSESSMENT FOR PBMS FACILITY CM 354-01, COUNTY OF SAN BERNARDINO, CA. 4PP | LSA | |
| SB-03577 | NADB-R - 1063577 | 2000 | LAPIN, PHILLIPE | CULTURAL RESOURCE ASSESSMENT FOR PBW VACILITY CM 233-01, SAN BERNARDINO COUNTY, CA. 6PP | LSA | |
| SB-03582 | NADB-R - 1063582 | 2000 | DUKE, CURT | RESULTS OF THE CULTURAL RESOURCE RECORD SEARCH AND EXTENDED SURVEY FOR PBMS FACILITY CM 354-01, SAN BERNARDINO COUNTY, CA. 14PP | LSA | |
| SB-03593 | NADB-R - 1063593 | 1998 | ALEXANROWICZ, JOHN STEPHEN, S. ALEXANDROWICZ, D. WROBLESKI, R. KRAMER, A. STOLL, and T. BELL | HISTORICAL ARCHAEOLOGY AT EL RANCHO DE CUCAMONGA, CITY OF RANCHO CUCAMONGA, SAN BERNARDINO CO, CA 2 VOL. 560PP | ACS | 36-007351, 36-007396, 36-007397, 36-007398 |
| SB-04033 | NADB-R - 1064033 | 2001 | BUDINGER, FRED | PROPOSED WIRELESS DEVICE MONOPOLE & EQUIPMENT CABINET SITE, 8248 19TH ST, RANCHO CUCAMONGA, CA. 9PP | TETRA TECH | |
| SB-04162 | NADB-R - 1064162 | 2002 | DUKE, CURT | CULTURAL RESOURCE ASSESSMENT: AT&T WIRELESS SERVICES FACILITY NO. D121, SAN BERNARDINO COUNTY, CA. 9PP | LSA | |

# Report List

| Report No. | Other IDs | Year | Author(s) | Title | Affiliation | Resources |
|---|---|---|---|---|---|---|
| SB-04508 | NADB-R - 1064508 | 2005 | THAL, SEAN M. | STROKES/CA-8584B. 16PP | EARTHTOUCH, LLC | |
| SB-05358 | NADB-R - 1065358 | 1976 | Sider, W.A. | Cucamonga Creek 1776-1976 After 200 Years. | | |
| SB-05489 | | | | | | |
| SB-05499 | NADB-R - 1065499 | 2003 | Hammond, Stephen R. and David Bricker | Historic Resources Compliance Report for the Relinquishment of State Route 66, City of Rancho Cucamonga, San Bernardino County, California. | | 36-002910 |
| SB-05638 | | | | | | |
| SB-06083 | | 2008 | Wlodarski, Robert J. | Bechtel Wireless Telecommunications Site ES0258 (Upland Water Tanks) located at 580 East 15th Street, Upland California 91785 | C.A.R.E. | |
| SB-06666 | NADB-R - 1066666 | 2009 | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga, Upland and Ontario, San Bernardino County, California. | | |
| SB-06667 | NADB-R - 1066667 | 2009 | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga, Upland and Ontario, San Bernardino County, California. | CRM TECH | |
| SB-07448 | | | | | | |

# Phase I Cultural Resources Assessment For a Proposed Commercial Development On a 10-acre Site in the City of Upland, San Bernardino County, California

## (Township 1 South, Range 7 West, Section 5, Mt. Baldy, California USGS 7.5' Quadrangle)

*Prepared for:*

**Frontier Communities**

*Prepared by:*
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**Hesperia, CA 92345**
**Randall C. Arnold, Jr.**

**Project: #2018-68**

**Type of Study: Phase 1 Cultural Resources Survey, Upland, San Bernardino County, Negative Report, Serrano, Cahuilla**

**July 16, 2018**

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## EXECUTIVE SUMMARY

RCA Associates, Inc. was contracted by Frontier Communities to conduct a Cultural Resources Survey for the proposed single-family home development that is situated on a 10-acre site in the City of Upland, APNs (1045-151-34), (1045-121-02), (0207-483-46) (Township 1 South, Range 7 West, Section 5, Mt. Baldy, CA USGS 7.5' Quadrangle) (Figures 1 and 2). The study was performed pursuant to the California Environmental Quality Act (CEQA). A cultural resources records search, field survey, shovel-test pits and Native American consultation and coordination were all elements of this project and were included within the Scope of Work. Native American individuals and tribal groups were contacted by email and letter for their input. These communications and the outreach are provided in Appendix B. Field survey investigations were conducted on July 12, 2018 by RCA Associates, Inc. and did not result in the identification of any new cultural resources, including prehistoric or historic archaeological sites or buildings, structures or objects within the project boundaries. A cultural resources record search was conducted at the South Central Coastal Information Center (SCCIC) on June 26, 2018 which did not identify cultural resources within the Project area. Two cultural resources surveys have been previously conducted within the Project area, however, no cultural resources had been previously recorded within the project boundaries. Seven cultural resources studies have been completed within a half-mile radius (buffer) of the Project. Three historic and prehistoric cultural resources have been previously recorded within a half-mile radius surrounding the project area.

The Native American Heritage Commission (NAHC) was contacted regarding the project and they completed a Sacred Lands File Search, which yielded negative results for Sacred Lands in the Project. The NAHC also provided a list of potentially interested and affiliated Native American individuals and groups. All of these parties identified by the NAHC were contacted for further information and potential concerns regarding cultural resources within the project area.

Ms. Jessica Mauck, Cultural Resources Analyst of San Manuel Band of Mission Indians (SMBMI), advised that the project is within the Serrano ancestral territory and overlaps with that of the Gabrieleno groups of the west. SMBMI expressed little concern regarding this project area. The Gabrieleno Band of Mission Indians- Kizh Nation replied via email to express their interest in the project and would like to consult with the lead agency.

If previously undocumented cultural resources are identified during construction activities, a qualified archaeologist must be contacted to assess the nature and significance of the find. Construction activities shall be diverted. If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of the origin and disposition of the remains pursuant to Public Resources Code Section 5097.98. The County Coroner must also be notified of the find immediately. If the remains are determined to be prehistoric or protohistoric

Native American in origin, the Coroner will notify the NAHC. The NAHC shall determine and notify a Most Likely Descendant (MLD) that will consult with the Project Archaeologist and recommend the manner of treatment and disposition for any human remains and associated offerings.

## INTRODUCTION

RCA Associates, Inc. is under contract with Frontier Communities to conduct a Phase 1 Cultural Resources Survey of the proposed commercial development on a ten-acre property located in the City of Upland, California, APNs (1045-151-34) (1045-121-02) (0207-483-46) (Township 1 South, Range 7 West, Section 5) Mt. Baldy, California USGS 7.5' Quadrangle. This study was performed pursuant to the California Environmental Quality Act (CEQA).

The California Environmental Quality Act (CEQA) requires consideration of project impacts on archaeological or historical sites deemed to be "historical resources." Under CEQA, a substantial adverse change in the significant qualities of a historical resource is considered a significant effect on the environment. For the purposes of CEQA, a "historical resource" is a resource listed, or determined to be eligible for listing, in the California Register of Historical Resources [Title 14 CCR §15064.5(a)(1)-(3)]. Historical resources may include, but are not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" [PRC §5020.1(j)].

The eligibility criteria for the California Register are the definitive characteristics for assessing the significance of historical resources for purposes of CEQA (Office of Historic Preservation). Generally, a resource is considered "historically significant" if it meets one or more of the following criteria for listing on the California Register:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

## NATURAL SETTING

The project area is located immediately south of the Transverse Ranges and just west of the mouth of Cajon Pass. The Transverse Ranges are a California geomorphic province represented by a series of mountain ranges that trend in an east-west direction for about 300 miles. The range is often deemed a means of separating Central from Southern California. These Transverse Ranges connect with the Coast Ranges to the west and to the Sierra Nevada chain to the north.

The Mojave Desert lays to the north and east. Finally, the trough of the Salton Sea and the Colorado Desert and Peninsular Ranges are situated to the south. The Transverse Ranges incorporate a number of individually, distinctive mountain ranges – the Santa Ynez, Santa Monica, San Gabriel, San Bernardino, Eagle and the Oricopia mountains, just to identify some. The natural flora of the Transverse Ranges is described as a mixed chamise-chaparral plant community. Chaparral is a plant community of dense brush found on steep, rocky slopes. The dominant plants found in this vegetation zone include manzanita, chamise, scrub oak, and ceonothus.

The Mojave Desert incorporates an immense area of eastern California covering 31,000 square miles. This northern desert interfaces with the Sonoran Desert to the south and the Yuma Desert to the southeast. It is separated from the Great Basin along the Garlock Fault that traverses the base of the El Paso Mountains. Throughout the Mojave Desert there exists numerous broad playas or dry lake beds that drain internally. These playas can become shallow ephemeral lakes when occasional heavy rains fall. However, in general, the Mojave Desert is a water impoverished region with only four to 13 inches of rain annually. In Death Valley, in certain years, virtually no measurable rainfall appears (less than one inch of precipitation annually). Temperatures vary greatly in the Mojave Desert but summers can be exceedingly hot - with the highest ground temperature ever recorded on earth posted for Death Valley at 134 degrees Fahrenheit. However, night-time temperatures drop dramatically and snow fall occurs regularly at higher elevations.

The Mojave Desert characteristically exhibits large land areas containing the grey-green shrubs of the creosote bush (*Larrea tridentata*). Other areas exhibiting alkaline soils contain expressions of saltbush (*Atriplex* spp.). Plant species present in the general vicinity of the Project site include: juniper (*Juniperus californica*), annual bursage (*Ambrosia acanthicarpa).* Nevada jointfir (*Ephedra nevadensis*), bladder sage (*Scutellaria mexicana*), rabbitbrush (*Ericameria nauseosa*), and Joshua tree (*Yucca brevifolia*). Other plants noted in the general vicinity include saltbush (*Atriplex* sp.), schismus (*Schismus barbatus*), cholla (*Cylindropuntia echinocarpa),* bunchgrass (*Phleum pratense*), white bursage (*Ambrosia dumosa)*, California buckwheat (*Ambrosia dumosa),* and brome grasses *(Bromus sp.).*

Typical Mojave Desert fauna include: bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), jackrabbit (*Lepus californicus*), cottontail, coyote, pronghorn, various reptiles (including the venomous Mohave rattlesnake and the notable chuckwalla) and rodents. Other animals include various species of waterfowl and numerous birds.

A biological resources assessment report was prepared for the site and submitted under separate cover.

# CULTURAL SETTING

## Prehistory

Synthetic treatments of the prehistory of the Mojave Desert are found in a number of academic references. The latter sources include topical treatments in Basgall (1993), Basgall and Hall (1994), Basgall et al. (1988), Bettinger and Taylor (1974), Garfinkel (2007), Garfinkel and Williams (2011, 2015), Garfinkel et al. (2010), Gilreath and Hildebrandt (1997), Grayson (2011), Lengner (2013), Schneider et al. (2000), Sutton et al. (2007), Ugan and Rosenthal (2015), Van Tilburg et al. (2012), Warren (1984), Warren and Crabtree (1986), Whitley (1998), Ugan and Rosenthal (2015) and Yohe (1992).

Research into the prehistory of the Mojave Desert has a lengthy pedigree. Perhaps some of the earliest scientific investigations were those conducted by the husband-wife team of William and Elizabeth Campbell working out of the Southwest Museum (Campbell 1931; Campbell and Campbell 1935; Campbell et al. 1935). During this same general time period Malcolm Rogers was conducting studies through his association with the San Diego Museum of Man. His research emphasized the identification of the flaked stone artifacts and prehistoric cultures mainly found in the Colorado Desert but overlapping the Mojave Desert as well (Rogers 1939). Another very early researcher in the area was Mark Raymond Harrington. Harrington conducted archaeological studies at the Stahl Site, Stahl Site Cave and Fossil Falls sites in the Coso Range while engaged by the Southwest Museum (1948a, 1948b, 1949, 1950, 1951, 1952, 1953, 1957).

In the 1960's Edward Lanning working with the University of California, Berkeley and wrote up the previous research completed at Rose Spring (CA-INY-372) in the Coso Range and this work served as a critical benchmark and anchor to develop the regional chronology. Robert Yohe returned to the site much later and provided an even more detailed and well-supported chronology bolstered by a suite of precise radiocarbon dates for this physically and culturally stratified site (Yohe 1992).

Perhaps the most intensive early studies were at China Lake completed by Emma Lou Davis. Her work continued from the 1960s into the mid to late 1970s and included intensive surface explorations and pioneering geo-archaeological research (Davis 1978). Although her assertions of very early pre-Clovis age occupations have been widely rejected, her multidisciplinary methods have provided well-grounded insights on late Pleistocene and early Holocene aboriginal land use. Excavations at China Lake also uncovered fluted points in putative association with burned; extinct megafaunal remains (Davis 1978). However, recent reassessments (Basgall 2007a, 2007b; Garfinkel et al. 2008) of Davis' findings failed to support the idea that artifacts and megafaunal bones were consistently related or that aboriginal activity is contemporaneous with extinct megafauna.

Much of the scholarly research in the Mojave Desert has been completed under the umbrella of cultural resource management studies. Many federal and state agencies (Bureau of Land Management, California Department of Transportation, California Department of Parks and Recreation, and United States Department of Forests) and private developers (relating to the construction of renewable energy initiatives employing both solar and wind) have been the major proponents and financial underwriters for these investigations.

The Mojave Desert has seen more archaeological study than perhaps many other areas of California. It has also spawned some of the most contentious dialogues in professional archaeology with respect to competing models attempting to illuminate the nature and antiquity of various prehistoric cultural manifestations. The focus of these debates relates to the nature and timing of various cultural transformations. Such discussions hinge on the age and character of technological shifts, settlement-subsistence change, economic developments, artistic and ideological transitions, prehistoric population movements / replacements and various reconstruction of linguistic prehistory (cf. Garfinkel 2006, 2007; Garfinkel and Austin 2011; Garfinkel et al. 2007, 2009, 2010; Grant et al. 1968; Goldsmith and Garfinkel 2013; Gilreath 2007; Gilreath and Hildebrandt 2008, 2011; Hedges 2001; Hildebrandt and McGuire 2002; McGuire and Hildebrandt 2005; Stewart et al. 2005; Van Tilburg et al. 2012; Whitley 1987, 1998, 2003; Whitley and Dorn 1987, 2011). Given the central importance of chronological controls, the prehistoric cultural sequence and related temporal periods remain an important and salient topic for continuing research.

**Cultural Sequence**

***Late Pleistocene: Paleo-Indian / Western Clovis Period***

Basally-fluted, projectile points of the Clovis (aka Western Clovis) cultural complex are generally considered to be the most dominant, hallmark of prehistoric occupation during the Late Pleistocene era. These Clovis points and their associated cultural materials have been the focus of intensive study and the general consensus is that they date from about 13,500 to 12,500 calibrated radiocarbon years (cal) before present (BP). Some researchers have tried to pinpoint the duration of the Clovis tradition to an even more exacting and narrower time span (12,800 to 13,200 cal BP) but recent critiques of that perspective support the notion that at least a millennium of time was necessary for the wide-ranging Clovis tradition to have developed and spread within the continental United States (cf. Goebel et al. 2008; Waters and Stafford 2007).

Until recently, the Clovis complex was considered to be the basement cultural expression in the Americas. However, reports from sites like Monte Verde (Chile), Paisley Cave (Oregon), the Schaefer and Hebior sites (Wisconsin), Meadowcroft Shelter (Pennsylvania), Page-Ladson (Florida), and the Debra L. Friedkin Site (Texas), have now provided substantial and persuasive evidence for pre-Clovis occupation dating to a period from about ca. 16,000 and 14,000 cal BP,

the latter archaeological complex having occurred some two to three thousand years before Clovis (Gilbert et al. 2008; Goebel et al. 2008; Waters et al. 2011b).

Unfortunately, as of yet, there is no tangible and compelling evidence within California or the Great Basin for such early pre-Clovis discoveries. Yet, there have been a number of claims (Davis 1978; Leakey et al. 1968) based on heavily weathered and crude cobble and core tools as part of a pre-projectile point tradition (cf. Moratto 1984:29-73). However, such claims have not withstood the test of time.

Nevertheless, although the Mojave Desert has posted early claims of great human antiquity, even Clovis-like fluted points discoveries themselves are fairly rare (cf. Rondeau et al. 2007). When such finds are identified they are most frequently isolates and typically found in association with now dry Pleistocene lakebeds. Besides the limited discoveries of fluted points, we have little in the way of related diagnostic elements of Clovis technology that would provide a more complete picture of the entire archaeological assemblage. Complementary artifacts, such as prismatic blades and cores and bone tools are commonly described from the Clovis heartland in the American Southwest and Plains (however cf. Fenenga 2015).

Further, there is long-standing ambiguity in the age and sequence of terminal Pleistocene cultural complexes in eastern California and the Great Basin generally. Some researchers have expressed doubts as to whether the Clovis Complex per se has a temporally or geographically extensive presence in California and the Great Basin. Further, some researchers question the true antiquity of these putative earliest California and Great Basin projectile point forms. Finally, other confounding issues remain with respect to the chronological relationship of one point type to another (e.g. Western Fluted vs. Concave Base vs. Western Stemmed).

China Lake Basin and the adjacent Rose Valley are home to some of the largest concentrations of fluted and concave base points in California. The sites in Rose Valley are located on relict terraces of the Lower Pleistocene Owens River. The Rose Valley sites were initially recognized and studied by Ferris Borden and the Archaeological Survey Association (Borden 1971; Moratto et al. 2018). The China Lake sites were researched by Emma Lou Davis (Davis 1978). A number of the fluted and unfluted concave base points discovered in the Coso Basin have yielded putatively ancient obsidian hydration dates that would provide a tentative late Pleistocene age determination (cf. Garfinkel et al. 2008; Moratto et al. 2018). Yet, no direct and associated radiocarbon determinations exist that demonstrate the age of these early points and there are only a handful (n = 4) of radiocarbon determinations dating to the Clovis age for any archaeological expressions in all of prehistoric California.

Nevertheless, recent obsidian hydration data provides a growing number of very large hydration rim measurements (greater than 16.0 microns) from several sites in the China Lake Basin and vicinity. These hydration measurements do support an age for both Western Fluted and Basally

Thinned Concave Base points dating to a time from about 12,000 to 13,500 cal BP. (Giambastiani and Bullard 2010; Rogers 2011; Garfinkel and Hopkins 2008; Garfinkel et al. 2016; Moratto et al. 2018). If those ages were further substantiated, that would imply a prehistoric California Paleoindian complex of equivalent age to the Clovis Tradition of the American Southwest and Plains. Significantly, the technological and typological elements for these early California projectile points appear slightly different and may represent a somewhat distinctive tradition - a bit different from their kindred artifacts in other areas of the United States.

In contradistinction to the above discussion, Beck and Jones (2010; see also Bryan 1988) argue, that Western Stemmed Points are in fact characteristic of the terminal Pleistocene and would be contemporaneous with the Clovis Complex. While it is widely assumed that fluted and unfluted concave-base points date to the terminal Pleistocene in the Mojave Desert, this has never been demonstrated radiometrically or chrono-stratigraphically. Nevertheless, recent finds at China Lake have noted that Fluted and Concave Base points have a different overall spatial distribution than Western Stemmed points. Finally, all three projectile point styles (Western Stemmed, Fluted and Concave Base) often occur in the same microenvironments, in closely similar depositional contexts, and at the very same sites (Basgall 1988, 2007; Basgall and Hall 1991; Giambastiani 2008, 2010; Giambastiani and Bullard 2010).

***Early Holocene: Mojave or Lake Mojave Period***

Significant environmental changes, correlating with broad shifts in regional temperature, occurred in the post-Pleistocene with only minor changes in rainfall. Increased runoff from glacial melting resulted in the infilling of valleys and basins by streams, marshes, and lakes. Initially these large bodies of water supported great amounts of biota – including big game animals (e.g., deer, antelope, and bighorn). During this time there exists an ancient, well-established and wide-ranging prehistoric tradition in the Mojave Desert dating from ca. 12,000 to 8,000 cal BP. This archaeological complex is a well-known expression and received its geographic referent from the landmark studies of the Campbells and their research associates (Campbell et al. 1937).

The Campbells and their collaborators worked along the relict shorelines of Pleistocene Soda Lake and Silver Lake in the eastern Mojave Desert near Baker, California. These early Holocene assemblages were recognized for their distinctive formalized flaked stone tool kits. The Lake Mojave flaked stone tools include large stemmed points (identified as either the larger Lake Mojave type or the smaller Silver Lake form) that are considered as chronological diagnostics. Associated with these temporally sensitive point/tool forms are other stone tools including bifacial crescents, heavily worked domed (steep-sided) unifaces (end scrapers and side scrapers), knives, bifaces, gravers, plano-convex limaces, and larger core-cobble tools (cf. Beck and Jones 1997).

Throughout southern California and especially in eastern California Lake Mojave era sites have been recognized with a variety of other identifiers. In the Colorado Desert, Malcolm Rogers calls

similar traditions as his Playa Complex (Rogers 1939, 1966). In the San Diego area, the related assemblages have been designated as San Dieguito (Warren 1967; Warren and True 1961). William Wallace (1962) employs the Lake Mojave moniker for all such expressions throughout southern California.

Significantly, the majority of the Lake Mojave sites are exclusively surface expressions making them difficult to date, and only infrequently are they dated directly by employing radiocarbon assays. Nonetheless, Beck and Jones (1997, 2010; Willig et al. 1988) have assembled a series of radiocarbon dates for these stemmed points. Their research indicates that the Lake Mojave-related materials are older than 9500 cal BP and are possibly as ancient as 13,200 cal BP. If such dates were to apply in California they would be contemporaneous with the ages applied to the Clovis Tradition in the American Southwest and on the Plains. Yet, perhaps contrary to expectations, dates for the Lake Mojave materials at Fort Irwin cluster from 9,500 to 11,000 cal BP (Basgall 1993; Sutton et al. 2007).

Claude Warren and his colleagues (Warren 1967, 1984, 1986, 2008; Warren and Crabtree 1986; Warren and Schneider 2003; Warren et al. 1986) and other researchers (cf. Bedwell 1970) recognize that Western Stemmed point sites of the Lake Mojave Tradition were most often associated with extinct lakes. Since these materials were clustered around ancient shorelines the logical conclusion was that this early lifeway was lacustrine based and that artifacts would best be interpreted as representing a hunting emphasis on lakeshore resources. Further, since few artifacts were discovered that could be interpreting as milling equipment, only a very minor expression of plant food exploitation was indicated.

However, more recent research in the central and western Mojave Desert attests to a different perspective with a wider range of habitats for sites outside of lakeshore settings (Basgall 1993; Basgall and Hall 1994; Basgall et al. 1988; Sutton et al. 2007). Further, the faunal remains recovered from such sites attest to a dominant expression of small mammals (especially lagomorphs) and reptile exploitation rather than large game such as deer, pronghorn and bighorn sheep. Additionally, milling equipment, although evidently only a minor element in the Lake Mojave archaeological assemblages, are indeed a regular part of the documented cultural materials at such sites. The latter perhaps indicates that plant food was of some importance in the diet of these early Holocene peoples. Nevertheless, use-wear studies suggest that corms and bulbs, especially marshland taxa rather than small seeds, were the predominant plant foods processed (Basgall 1993, 2000).

Most researchers agree that high diversity of toolstone material and extensive curation and maintenance of Lake Mojave-age tools supports the conclusion that very large foraging areas and frequent residential moves were typical (Basgall 1989; Basgall and Hall 1994; Basgall and McGuire 1988; Delacorte 1999; Delacorte and McGuire 1993). It is posited that at this early time foraging groups were limited to a small number of family units and the groups themselves were

quite small. The food resources that were extracted would have been exhausted quickly causing people to move about the landscape often. Considering these frequent moves, the stone tool assemblages remained small and relatively homogenous (Kelly 1983, 1985, 1988; Shott 1986, 1989; Thomas 1983a, 1983b).

***Middle Holocene: Little Lake or Pinto Period***

In the Middle Holocene during the time from ca. 8,000 to 4,000 cal BP temperature and aridity peaked. Lowland bodies of water shrank in size and associated plant communities dwindled - reaching a state that was incapable of supporting the former abundance of large game (Sutton et al. 2007). With the exception of certain rare refuge areas, human land use shifted to upland areas where a few relict streams and lakes remained. Correlating with these changes was the inception of a cultural expression known as the Pinto Complex.

Researchers have recognized that it has been challenging to clearly articulate the Middle Holocene cultural-historical traditions and settlement systems since few prehistoric sites date within this specific time frame. The latter circumstance may owe to a lack of geological visibility (Basgall 2009; Meyer and Rosenthal 2010) or alternatively this may be a reflection of the heightened aridity or a corollary demographic collapse (Elston 1982; Grayson 2011; Sutton et al. 2007; Warren 1986). From either perspective, there are a paucity of radiocarbon assays that fall within the Middle Holocene time and these expressions are especially absent during the waning years of this period - from ca. 5000 to 4000 cal BP (Sutton et al. 2007).

The Pinto Complex, rather than representing a different cultural group, was posited as an outgrowth of the former hunting tradition of the Lake Mojave Complex of the Early Holocene. Such a model was based on a variety of similarities in the two traditions. Spatial and temporal overlap in projectile point forms, the continued use of difficult-to-reduce toolstone (basalt and igneous fine-grained lithic materials) for bifacial tools - distinctly different from the use of cryptocrystalline and obsidian materials so common to later periods, continuity in the character of flaked stone production emphasizing percussion flaking in contrast with a later emphasis on pressure flaking, and the continued popularity of specialized tool forms (biface knives, ovate domed and keeled scrapers, and engravers) - all suggest a pattern of continuity.

Pinto Complex sites decline in number during the driest portion of the Middle Holocene era from 6500 to 4000 cal BP and are largely restricted to spring-side localities. Besides the differing land use patterns, the stone tool assemblage changes at this time from the formalized stone tool forms of the Early Holocene being replaced by flake scrapers, handstones, and milling slabs. Ground stone implements signal an important distinction and a growing emphasis on small seed use. Since hunting equipment persists, Claude Warren and others (Warren 1967, 1984, 1986) have suggested that large game procurement continued despite deteriorating climatic conditions and declining big game populations.

Archaeofaunal assemblages from Pinto sites attest to the fact that artiodactyls by this time are almost completely absent with small game, including tortoise, becoming the norm. Pinto populations, originally geared towards hunting, would have been hard-pressed to accommodate the changing environmental conditions and their adaptation may have ultimately failed. Populations may have either suffered extinction or perhaps migrated to more well-watered areas, abandoning their desert homes.

A few Middle Holocene sites in the southern Owens Valley and Rose Valley have produced assemblages similar to those in the Mojave Desert and appear to be consistent with generalized adaptations of highly mobile foragers with wide-ranging settlement patterns. However, substantial house floors discovered at Lubkin Creek (CA-INY-30) and the diverse array of occupational debris at the Stahl Site (CA-INY-182) at Little Lake (in the Coso Range) has led some to posit much greater residential stability and a degree of permanence in settlement pattern in some exceptional instances.

The hallmark and defining diagnostics for this period are large, heavy, bifurcate-stemmed dart points known as the Little Lake Series (Basgall and Hall 1992, 1994, 2000; Bettinger and Taylor 1974; Fitzgerald et al. 2005; Harrington 1957; Lanning 1963; Vaughan and Warren 1987). Researchers have recognized that these Pinto-like points were most frequent at the Stahl site near Little Lake (Harrington 1957).

The Pinto-like points that were discovered at Little Lake were originally thought to be morphologically distinct from Pinto points identified at the type site in the Pinto Basin in Riverside County in the southern Mojave Desert (Amsden 1937; Campbell and Amsden 1934; Campbell and Campbell 1935; Schroth 1994). In-depth research (Basgall and Hall 2000) relating to the questions of chronology and point classification suggests that the Little Lake points are largely indistinguishable from Mojave Desert examples typically identified as Pinto points.

The Basgall-Hall research redefined the Pinto Series indicating that there existed a larger, heavier, and more robust variant of this point style that has an age from 7500-4000 radiocarbon years before present (rcybp). A smaller, lighter, and more gracile form, more characteristic of the northern Great Basin, is equivalent with the Gatecliff Split-stem type previously identified by David Hurst Thomas (1981). Those latter artifacts are argued to date to a more recent vintage, consistent with a temporal range from ca. 5000-3200 rcybp. A further result of the Basgall-Hall Study was the discovery that there is considerable spatial overlap between both the robust and gracile variants with both forms having substantial representation in eastern California.

Other researchers disagree with the Basgall and Hall Pinto point chronology. Haynes (2004) argues that Pinto points range in age from 9,500 to 5,500 rcybp. Perhaps an age range of 11,000 to 3,500 cal BP is a more accurate representation for the full span of use of this rather enigmatic point form. Recent studies have led many researchers to conclude that Pinto points have a much

longer duration than has been typically applied. Pinto points, based on their most recent re-evaluations, are sometimes contemporaneous with Western Stemmed points (as above). However, Pinto points were infrequent during the earliest years of their introduction but flourished and endured for a much longer period time after Western Stemmed points ceased.

Heavily worn stone tools crafted from exotic toolstone suggests that prehistoric Middle Holocene Natives were still highly mobile. These patterns led Basgall and Hall (1992, 1994) to conclude that both early and middle Holocene adaptations in the Mojave Desert represent a more generalized subsistence orientation than conventionally portrayed by Warren (1967, 1984, 1986) and others.

***Late Holocene: Newberry Period or Gypsum Complex***

In the Late Holocene, beginning ca. 4000 / 3500 cal BP and continuing to about 2000 cal BP, significant interregional variability in aboriginal land use can be recognized. With respect to the local environmental conditions, Mehringer and Sheppard (1978) based on lake-core sampling at Little Lake, identify that available water increased about 3000 cal BP, with a subsequent dry period at about 2000 cal BP. Hence, cool winters and relatively wet intervals were characteristic of what is known as the Neo-Pluvial Period that occurred between 4000 and 2000 rcybp (Wigand and Rhode 2002).

In the Mojave Desert, Basgall and Hall (1992, 1994) identified cultural deposits from Fort Irwin that include a full complement of milling equipment, flaked stone tools, and the replacement of basalt and rhyolite by cryptocrystalline silicate toolstone. The occurrence of bifaces increases dramatically during this time. Nonetheless, prehistoric sites are often small and it has been argued that these settlements represent wide-ranging mobility oriented to short-term occupations rather than targeted procurement of specialized resources.

Many radiocarbon assays from houses and features are documented from the southern Owens Valley (Basgall and Delacorte 2012; Basgall and McGuire 1988; Byrd and Hale 2003). These well-built houses and associated remains provide robust data for chronological controls. These remains indicate an emphasis on cached and curated articles (including bifaces, bone tools, and milling equipment) and lend credence to the premise that these particular sites were seasonally re-occupied. Obsidian tool/debitage sources appear to indicate a wide-ranging and extremely expansive yet regularized annual settlement round. From food remains (faunal material and plant macrofossils) one may infer that forays were made to long-distance upland settings to procure specialized resources (pinyon nuts, bighorn sheep, and marmots) that were brought back to the base camp.

Warren et al. (1984) provide a contrasting view for this period and argue for the prominence of large game hunting due in part to their natural abundance based on ameliorating climatic conditions. Additional intensification in the use of plant foods is represented by increased

numbers of milling equipment. Warren and others identify a change in social organization from the smaller family-band units in earlier eras to multi-family groups. William Hildebrandt and Kelly McGuire (2002) similarly argue that settlements during the Late Holocene (Middle Archaic also known as the Newberry Period) may have been less mobile than originally implied and may be best interpreted as year-round occupations. They also argue that the characteristic settlement pattern appears to have incorporated sedentary occupations of ecological sweet spots where women remained at hamlets while men ranged to distant outlying areas for artiodactyl hunting.

One implication of this emphasis on artiodactyl exploitation was the necessity of serviceable hunting equipment. Stone tool reduction and particularly obsidian biface manufacture became critically important from about 2500 to 1500 cal BP. Amy Gilreath and William Hildebrandt (1997, 2011) argue that in the Coso Basin, obsidian stone tool reduction reached a peak level of task specialization where early stoneworkers produced stone bifaces in enormous numbers both for domestic use but mostly as surplus exports intended for trans-Sierran trade. During this same time span, an enormous number of rock drawings (petroglyphs) are recognized and appear to be associated with increase rites, revealing a level of socio-ceremonial complexity exceeding that of earlier and later periods (Garfinkel 2006; Garfinkel et al. 2009; Yohe and Garfinkel 2012).

Prehistoric settlements dating to the Late Holocene are marked by the occurrence of medium-sized to large stemmed and notched points. The most frequent forms are variants of the Elko, Humboldt (Concave Base and Basal-notched), and Gypsum Series. Heizer and Baumhoff (1961) were the first to define Elko points. This series is composed of large, heavy, notched points with variable stem characteristics (Heizer et al. 1968; O'Connell 1967). These include eared, corner- and side-notched specimens. Elko Contracting stem forms are often assigned to the Gypsum type having the same general chronological frame. In the western Great Basin, Elko points have often been found in contexts dating from 3750-1290 cal years B.P. (Basgall and McGuire 1988; Bettinger and Taylor 1974; Gilreath and Hildebrandt 1997; Heizer and Hester 1978; Justice 2002; Thomas 1981). Such a chronological position is supported by a plethora of radiocarbon, stratigraphic, and obsidian hydration data. However, it is becoming increasingly apparent that large, corner-notched and side-notched, variants of this Elko form sometimes occur in earlier contexts.

Gilreath and Hildebrandt (1997) observed that more robust Elko points, especially those thicker than 6.5 mm, regularly produce obsidian hydration dates that are more ancient than the Newberry Period. One explanation for this problem is the difficulty in identifying between earlier Pinto and the more recent look-alike Elko forms (Basgall and Hall 2000; Vaughan and Warren 1987). Finally, the Rose Spring site (CA-INY-372) on the western edge of the Coso Range is a culturally and naturally stratified deposit. Five separate successive units provided cultural material amenable to dating. The lower three strata range in age from ca. 4000 to 1700 cal BP and as such fall within this period (Clewlow et al. 1970; Yohe 1992).

### *Late Holocene: Haiwee, Rose Spring, Saratoga Springs Period*

The Mojave Desert witnessed a significant series of adaptation shifts beginning in this time period (ca. 2000 to 700 cal BP). During the onset of the period, a dramatic set of subsistence-settlement changes were documented. These changes include: the introduction of the bow and arrow replacing the dart and atlatl, a dramatic decrease in large game hunting, increased reliance on dryland hard seeds, the beginning of intensive green-cone piñon pine nut exploitation, and the development of sites emphasizing the acquisition of easily procured and abundant small game animals (especially with respect to large numbers of lagomorphs and grebes). These cultural changes may reflect a Numic (Great Basin Paiute-Shoshone) in-migration. Certain technological innovations and labor-intensive adaptive strategies are also broadly consistent with those of the intrusive Numic groups (Bettinger and Baumhoff 1982; Delacorte 1994, 1995).

In the western Mojave Desert, specialized sites first occur that are single component loci targeting small, easily-harvested, game animals harvested through communal hunts and mass capture that focus on jack rabbits and grebes (Gold 2005; Garfinkel 2006; McGuire et al. 1982). These sites and similar localities often contain abundant portable milling equipment, rock ring structures, bedrock milling, and plant food threshing features. These data reflect a shift to more intensive use of small game and local plants (dryland hard seeds) perhaps as a means of mitigating increasing human population pressure – consistent with the model presented by Bettinger and Baumhoff for Numic adaptations (1982).

Such an adaptation would have perhaps provided Numic peoples with a competitive advantage over existing pre-Numic populations since it would have enabled them to exploit a wider range of resources that were more costly to collect and process. Hence, resources with high extractive and processing costs would have been exploited only after the arrival of Numic groups in the area (cf. Bettinger and Baumhoff 1982; Delacorte and McGuire 1993).

From a careful study of the archaeological record, a pattern of lowland, intensive small-game hunting camps appears to have occurred with the development of large-scale, intensive, upland green-cone piñon pine nut exploitation. This pattern also is contemporaneous with an initial focus on the acquisition, mass processing, and storage of dryland seeds (Basgall and Delacorte 2003; Basgall and Giambastiani 1995). These seed camps routinely include rock rings, thought to be the foundations of brush structures. Many of these rock structures contain doorways facing toward the rising sun and are associated with numerous handstones, milling slabs, and bedrock grinding features.

Single-component Haiwee-age hunting camps are frequently located in "geographically isolated areas" (Delacorte 1994). Such localities provided access to a limited range of biotic communities and appear to have a rather specialized focus on a narrow array of subsistence resources. Hence, these settlements are a distinctly different group of sites from earlier or later occupations that tend

to overlap at the same settlements and hence evince a lack of continuity from earlier settlements.

Gilreath and Hildebrandt (1997) note that Coso obsidian lithic production shifts to major obsidian outcrops in Late Newberry (500 B.C. to A.D. 600) and this pattern continues into the Haiwee interval (A.D. 600 to 1300). Obsidian quarrying during this time is confined to a few massive exposures rather than the less plentiful but more widespread secondary deposits. In the Haiwee period, nearly exclusive use of the massive Sugarloaf Mountain Coso obsidian exposure occurs with other deposits largely ignored.

On the margins of Koehn Lake in Fremont Valley, south of the Indian Wells Valley and the Coso Range, Sutton (1987, 1991) reports on a village site (CA-KER-875) dating to this period. House structures with juniper center posts (*Juniperus* sp.) were documented. The site is well dated with radiocarbon assays and Coso obsidian hydration dates and appears to have been associated with a standing lake. The site was abandoned during the drying up of the area correlating with the initiation of a series of epic droughts known as the Medieval Climatic Anomaly (ca. AD 970 to 1350).

Rose Spring points are one of the key hallmarks of this time period. These points were originally recognized and described from the type-site of that same name, located in southern Owens Valley (also known as Rose Valley) on the western edge of the Coso Range (Lanning 1963: Yohe 1992, 1999, 2000). The Rose Spring arrow point is a small, narrow, triangular arrow point with a variety of stem forms. Rose Spring points are time markers and date primarily to the interval from ca. 2000-650 cal B.P. in the western Great Basin (Basgall and McGuire 1988; Bettinger and Taylor 1974; Garfinkel 2007; Gilreath and Hildebrandt 1997; Thomas 1981; Yohe 1992, 1999, 2000).

***Recent Holocene: Marana, Late Prehistoric***

This final cultural period (700 cal BP to the historic) represents the ethnographic occupation in the Mojave Desert by the Kawaiisu, Panamint Shoshone, Serrano, Chemehuevi, and Mohave. Desert Side-notched and Cottonwood arrow points are characteristic and brownware ceramics, imported soapstone beads, and pictographs also date to this time frame, as do many sites associated with systematic and intensive upland piñon exploitation (Bettinger 1978; Garfinkel and McGuire 1980; McGuire and Garfinkel 1976, 1980).

Resource intensification that began in the prior period continues and strengthens with settlements tied to seasonal differences in resource availability. The most spatially confined seasonal movement and the smallest foraging ranges occur during this time period. Region-wide expansion of diet breadth and intensification of small seed resources involved a change in the technology used in the collection and processing of these resources. It is argued that cutting and mass collecting of green, dryland, hard seeds provided a considerably higher return than was possible using the former method of seed beating. This pattern begins about 1300 cal BP but increases

substantially throughout the Late Prehistoric (650 cal BP – Contact) and into the Protohistoric era. Direct flotation evidence indicates mass harvesting and threshing of Indian rice grass (*Achnatherum hymenoides*), cattail (*Typha* spp.), goosefoot (*Chenopodium* spp.), and blazing star (*Mentzelia* spp.) seeds.

This time period also sees the final collapse of trans-Sierran trade in Coso obsidian. The early emphasis (ca. 8000-1000 cal B.P.) on biface preform or flake blank technology gives way to flake-based reduction. Large bifaces decrease in abundance, yet also diminish in size and formality ultimately being replaced by more numerous flake-based tools. Artiodactyl exploitation is dramatically reduced and replaced by procurement of small game including a tremendous increase in desert tortoise and reptile use. Evidence of increased contact with outside populations (e.g., the American Southwest) and the expansion of Numic-affiliated populations out of eastern California into most areas of the Great Basin, and much of the Mojave Desert are recognized during the last 1000 years (Bettinger and Baumhoff 1982; Fowler 1972; Lamb 1958).

**Table 2. Prehistoric Cultural Sequence for the Mojave Desert Region**

| Cultural Complex | Approximate Time Period in Calibrated Radiocarbon Years Before Present (cal B.P.) and Calendar Years Approximated as AD/BC | Artifact Characteristics |
|---|---|---|
| Fluted and Concave Base points, Late Pleistocene Period (Paleoindian) | 13,500 – 12,000 cal B.P.; 10,000 BC to 11,500 BC | Fluted points and Concave Base points (Western Clovis) |
| Lake Mojave Period | 12,000 – 8,000 cal B.P.; 10,000 BC to 6,000 BC | Western Stemmed points (Lake Mojave and Silver Lake) |
| Little Lake (Pinto) Period | 8,000 – 4,000 cal B.P.; 6,000 BC to 2000 BC | Pinto and Leaf-shaped points |
| Newberry (Gypsum) Period | 4,000 – 2000 cal B.P.; 2000 BC to AD 1 | Gypsum, Elko, and Humboldt Series points |
| Haiwee (Saratoga Spring) Period | 2000 – 700 cal B.P.; A.D. 1 – 1300 | Rose Spring, Eastgate, and Saratoga Springs points |
| Marana (Late Prehistoric) Period | 700 cal B.P. – Historic; AD 1300 – Historic with European explorers ca. AD 1770 | Desert Series (Cottonwood and Desert Side-notched) points and ceramics |

(Based on discussions in Bettinger and Taylor 1974, Garfinkel 2007; Warren 1980, 1984,)

## Ethnography

Recent research by Earle (1990, 1997, 2004a, 2004b, 2005a, 2005b), King (2003), and Johnson and Lorenz (2006) have helped to clarify the ethnic identification of Mojave Desert Native American groups. Their work with the John Peabody Harrington notes combined with analysis of the Franciscan sacramental registries testify that Mojave Desert dwellers in the Upland area were speakers of a dialect of Serrano. Surviving vocabularies and word lists support the identification of desert groups known as Vanyume (Garces' term was Beneme) as related to the Serrano. It has been further verified that Native groups occupying villages on the Mojave River near Victorville and in the region east of Barstow maintained marriage ties to downriver communities and were Vanyume in ethnic and linguistic affiliation.

Earle (1990, 1997) supports King's revisions of earlier territorial boundaries asserting that Serrano territory included the northern slopes of the San Gabriel Mountains, the Mojave River, and Antelope Valley. It also appears from their research that both the south and north slopes of the San Gabriel Mountains were "owned" and occupied by Serrano speakers.

Early 20th century ethnographic fieldwork among the Serrano was conducted by Kroeber (1925), Gifford (1918), Strong (1929), Benedict (1924), and Harrington (1986). More recent research by Bean (1972), Bean and Smith (1978), and Bean, Vane, Lerch, and Young (1981) has helped to focus attention on key research questions in an attempt to clarify the relationship of Serrano land use patterns, territorial attributions, subsistence-settlement patterns, and social, ceremonial, and political organization.

The economic resource base of the Serrano was determined in part by the seasonal availability of key animals and plants exploited for basic subsistence (Earle 1992). Hunting activities supplemented a diet mainly emphasizing plants. Hunting excursions were both an individual affair but also incorporated communal drives, and trap lines to snare small animals (e.g., squirrels, rodents, tortoise, and chuckwalla). Some desert hunting areas to the east in the Mojave Desert and in the vicinity of the Mojave River may have been shared with adjacent groups (e.g., Chemehuevi and/or Mojave).

Mule deer were available in the San Gabriel and San Bernardino Mountains. Deer would migrate to lower elevations during the winter and would be available in the lower foothills. Pronghorn frequented the valley floor year-round but were not consistently abundant and were hunted only occasionally using communal surrounds and group drives. The latter technique was also used to ensnare large numbers of jackrabbits during the fall when they were especially abundant. Mountain sheep were available in the higher mountains but would have been rarely procured. Waterfowl could be captured using bows and arrows and special nets. Ducks, quail, geese, and grebes would have been available in considerable numbers during their breeding seasons and in association with riparian settings.

Abundant stands of acorns, juniper, mesquite, and pinyon were available to extended gathering expeditions. These might involve several lineages collaborating under one leader's authority and would have entailed accessing the resource base of surrounding groups (Bean and Smith 1978; Benedict 1924:391-392; Drucker 1937). Cattail / bulrush seeds (*Typha* spp. and *Scirpus* spp.), various roots, shoots, bulbs, and other hard seeds were all principal plant foods. The most likely plant resources that were of significant economic importance that have been identified paelobotantically or noted in the immediate vicinity of the Project were Indian rice grass (*Achnatherum hymenoides*), chia (*Salvia columbariae*), blazing star (*Mentzelia* spp.), and goosefoot (*Chenopodium* spp.)

Edward W. Gifford conducted a detailed study of the marriage practices and sociopolitical organization of native southern California Native Americans during the time from 1916 through 1917 (Gifford 1918). Based on these studies, he developed a model of Serrano social organization (Earle 2004a, 2004b). William Duncan Strong (1929: 5-35) conducted even more extensive studies among the Serrano, Cahuilla, Luiseño, and Cupeño in 1925. His record is most significant as a very early observer of the Serrano kinship system. He indicated that the Serrano were an unusual California group possessing true patrilineal clans. A clan is a kin group based on descent from a common ancestor, as traced through the male or the female line. Clans are normally exogamous, marriage within the clan being regarded as incest.

Patrilineal clans are patterned such that all males, their descendants, and their wives were part of a single group. Clans may be segmented into subclans or lineages. A woman retained her own lineage name but upon marriage was incorporated into the clan of her husband. The transfer of women from one ceremonial affiliation to another, upon marriage, was characteristic of all southern California Takic (the linguistic subfamily of the Serrano) groups.

King's research provides compelling evidence that the Serrano exhibited a totemic moiety structure (contra Blackburn and Bean 1978). A moiety is either of two kinship groups based on unilateral descent that together make up a tribe or society. Totemic moieties are two-fold divisions of society with subgroups that identify themselves as descended from a prominent religious figure (mostly animal-humans) that are part of their oral traditions. In the Serrano case, their society was divided into two parts identified with either Coyote or Wildcat. The Coyote moiety had the most important political leaders. Moiety out-marriage excluded partners from half the neighboring Serrano settlements. Hence, only settlements of opposing moieties were interrelated through marriage.

Serrano villages were generally more dispersed in the Mojave Desert. This dispersed pattern resulted in marriages linking together very large areas. Many of the settlements had marriage ties with villages over 50 miles away and counter intuitive was the fact that the closest relationships were not necessarily with the nearest villages – but rather with settlements affiliated with opposing moieties further distant.

King's study of the mission registries indicates that there were many important hereditary positions among the Serrano. Each village contained a chief, ceremonial manager, two messengers, as well as various shamans, diviners, and other ritual specialists. Each of these leaders oversaw different elements of Serrano life involving festivals, dances, and warfare.

Ethnographic data attests that a major native trade and travel corridor facilitated a long-distance exchange system. Recent research has supported the importance of long distance trade linking coastal southern Californian Chumash tribes with inland groups including the Yokuts, Kawaiisu, Serrano, Chemehuevi, and the Mohave in California and the Walapai, Havasupai, and Hopi in Arizona (Earle 2005a). Shell bead trade was one of the mediums of exchange and was used as a kind of currency or money. This system was significant since it involved trade, travel, and exchange covering hundreds of miles and was a system of exchange of native goods that linked various ethnic groups politically and economically.

This trade and travel route ran from the American Southwest (principally the Hopi territory in Arizona), along the Colorado River to the Mojave River thence through the central Mojave Desert into the Antelope Valley and east to the Pacific Coast (Davis 1961; Farmer 1935; Sample 1950). These circuits of exchange cut across political and cultural boundaries. A number of researchers have argued that such an exchange system may have been an influential factor in facilitating semi-sedentary settlement and complex sociopolitical organization for the Serrano (Earle 2005a; Robinson 1977; Sutton 1980).

Davis (1961) after reviewing the available data on native California trade and exchange determined that in southern California the only Native group to travel great distances in trading expeditions were the Mohave. It appears that the Serrano developed long-standing political and social relationships with the Mohave. In fact, the Serrano were their exchange or trading partners and acted as hosts facilitating their travel through sometimes unfamiliar and potentially hostile territories.

**History**

The Historic era of California is divided into the Mission or Spanish Period (1769 to 1831), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present).

***Spanish Period (1769-1831)***

The first known European explorers to pass through the Mojave Desert and travel into the San Bernardino Mountains were Lieutenant Pedro Fages and a party of soldiers in 1769. This group of explorers were led by a Spanish priest, Francisco Garces, who guided Juan Bautista de Anza through the high desert region. In 1771, De Anza led a group from Arizona to create a headquarters at the Mission San Gabriel near what is now the City of Pasadena. Mission San Gabriel Archangel was formally established in 1771, proved to be the most economically successful of all the

California missions. Its outlying ranch lands, grain fields, orchards and vineyards constituted a vast pastoral empire, eventually extending many miles inland into the San Bernardino Valley. From the time of the Anza expedition until the Mexican Rancho Period (see below), the land surrounding Ontario was employed as grazing land by the Mission. Cattle ranching during this time became a thriving industry. Cattle bred rapidly in this more amenable Mediterranean climate. Soon hundreds of thousands of head of cattle were ranging across the verdant pasture lands.

In 1772, Pedro Fages, a military commander, tracked deserters throughout San Bernardino County. In 1774, Juan Bautista de Anza led an expedition from Mexico and set up camp along San Antonio Creek. The Anza camp site was near present day Ontario. Anza named that place Arroyo de los Osos, or "Bear Gulch."

***Mexican or Rancho Period (1831-1848)***

The notable Old Spanish Trail was established between southern California and Santa Fe, New Mexico in the 1830s (Beck and Haase 1974). Traders from New Mexico traveled for two months to cross the rugged terrain bringing woolen goods on mules and pack horses and trading them for horses, mules, silks and Chinese goods from California. The San Bernardino Valley provided as an excellent pasturage for the animals involved in these trading affairs.

Spanish rule was overthrown by Mexico in 1791, and eventually the missions lost their land holdings as the Mexican government passed the Secularization Act in 1833 (Beattie and Beattie 1974). Following the secularization of the missions, large land grants were provided to the most prestigious and well-connected citizens. This change in land tenure ultimately led to European settlement of the ranchos for raising cattle in the San Bernardino Valley.

The Rancho Period lasted from 1834 until the Mexican War of 1846. Colonists were encouraged to settle in the San Bernardino Valley to help protect the region from raids by local Indians. Recipients of the land grants included Spanish gentlemen (dons) from many of what came to be known as the first families of California, such as the Lugos, Sepulvedas, Yorbas, Bandinis, Tapias, Palomares, and Picos.

***American Period (1848- Present)***

After the Mexican-American War in 1848 and the discovery of gold in California, the Old Spanish Road was widely-used trade route for the shipment of goods and Mexican mules and horses. This allowed travelers from Salt Lake City to Las Vegas to travel through the Cajon Pass to reach San Bernardino and Los Angeles.

In 1853 the County of San Bernardino was created and divided into three townships: San Bernardino, San Salvador and Chino. San Bernardino was designated as the county seat, with the Mormon Council House serving as the first courthouse.

Beginning in 1873, San Bernardino County saw many new railroad lines and train depots being constructed. By 1886, the San Bernardino Valley had two transcontinental railroad systems. In the 1870s and 1880s, cowboys continued to lead herds of cattle over trails through the valley to the railroads. In the 1870s and afterward, small towns in the high desert region and near the Calico Mountains were established as railway stops on the Santa Fe Railroad (Kyle 1990). A silver strike in the Calico Mountains brought upon a modest mining boom in 1881 (Schuiling 1984:95).

Another impetus to growth was the growing importance of citrus agriculture. The area exhibited especially favorable circumstances for citrus growing. These factors included the decomposed granite soil, good drainage, ready water, abundant sunshine, and cool winter nights. The completion of the railroads and the growing citrus industry facilitated a land boom. During the interval of the last two decades of the nineteenth century (188—1900), 30 new communities were initiated in the region.

## PERSONNEL

Dr. Alan Garfinkel Gold, RPA requested the staff at South Central Coastal Information Center (SCCIC), California State University, Fullerton to conduct a cultural resources records search. Following receipt of the data from SCCIC, a systematic pedestrian field survey was conducted. Following completion of the field survey, this report was prepared based on the results of the data search and the field investigations.

## METHODS

### Research

A cultural resources records search was conducted by the SCCIC on June 26, 2018. The results of the records search are summarized in this report. The records search details the previously documented cultural resources in the Project area and employs a half-mile buffer surrounding it. A Sacred Lands File Search was also conducted through the Native American Heritage Commission (NAHC). This search offers valuable contextual information regarding Native American traditional land use in the high desert region. Eleven interested parties of Native American heritage were identified as being associated with the area and were contacted for consultation. A copy of the transmittal letter and documentation of the RCA Associates outreach are provided in Appendix B.

### Field Survey

A comprehensive archaeological field survey was conducted by Dr. Gold and Alina Landa on July 12, 2018. The survey was conducted by walking roughly parallel transects in an east-west direction. The transects were spaced approximately 10 meters apart to provide thorough coverage of the Project site. 4 shovel-test pits were excavated to a depth of approximately 30 cm. The project site is located north of 15th Street and south of what is currently Upland Hills Country Club.

## RESULTS

### Native American Consultation

The NAHC conducted a Sacred Lands File Search and returned negative results for Sacred Lands in and near the proposed Project area. All potentially interested tribes identified by the NAHC were contacted for information regarding their knowledge of cultural resources that were within or near the Project area. These groups are: Gabrieleno Band of Mission Indians - Kizh Nation, Gabrieleno /Tongva San Gabriel Band of Mission Indians, Gabrieleno /Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Morongo Band of Mission Indians (Chairperson and Cultural Resources Manager), Pauma Band of Luiseno Indians - Pauma and Yuima Reservation, San Fernando Band of Mission Indians, San Manuel Band of Mission Indians, and Serrano Nation of Mission Indians.

Ms. Jessica Mauck, Cultural Resources Analyst of San Manuel Band of Mission Indians (SMBMI) replied via email to advise RCA that the Project area is within Serrano ancestral territory and is of interest to the Tribe. However, SMBMI indicated that the Project is unlikely to have any major concerns with the area. The Gabrieleno Band of Mission Indians- Kizh Nation, the Administrative Specialist replied via email to express their interest to consult with the City of Upland.

### Cultural Resources Records Search

The South Central Coastal Information Center (SCCIC) at California State University, Fullerton conducted a record search of previously documented cultural resources sites and cultural resources surveys conducted on the property and within a half-mile radius (buffer) of the subject property. The search included a review of all historic and prehistoric archaeological resources and any built-environment resources as well. Additionally, this review includes an archival search of the existing cultural resources reports on file with the Information Center. The California Points of Historical Interest (CPHI), California Historical Landmarks (CHL), California Register of Historical Resources (CALREG), National Register of Historic Places (NRHP), and California State Historic Properties Directory (CHPD) were all reviewed for the project site. According to the Information Center results, two cultural resource studies have been previously conducted within the project area, however, no cultural resources were documented during these studies. Seven cultural resources reports have been completed and those studies identified three cultural

resources within the half-mile search radius (buffer) surrounding the project area. Table 3 shows the known cultural resources sites documented within a half-mile radius surrounding the project area.

**Table 3. Known Cultural Resources Within the Half-mile Buffer of the Project Area**

| Primary Number | Trinomial/ Resource Name | Age | Type | Evaluation |
|---|---|---|---|---|
| **P-36-000899** | CA-SBR-000899/ Red Hill Site | Prehistoric | Milling Artifact Concentration | 1975 (Crowley) |
| **P-36-006255** | CA-SBR-006255H | Historic | Wells/cisterns, Water conveyance system, Dam, Walls/fences, Standing Structures | 1989 (Hammond/ Sutton, Caltrans); 2009 (Michael Dice, BA); 2014 (A. Myers, ECORP) |
| **P-36-015497** | Base Line Road | Historic | Highway/trail | 1973; 2014 (Josh Smallwood, Helix) |

**Site P-36-000899**

Site P-36-000899 consists of one metate, one metate fragment, and six manos.

**Site P-36-006255**

Site P-36-006255 consists of a historic-period water system constructed in the early 1930s. Hammond and Sutton recorded sixteen water features which includes two bridge-like water diversion structures, a water diversion, two concrete stand pipes, a horizontal riveted steel pipe, wire-bound rock, eight water spreading/distribution gates, and a horizontal concrete pipe (Hammond 1989). Michael Dice of Michael Brandman Associates updated this site record in 2009 as part of the San Antonio Trails project and included additional features. He identified an additional seven east-west trending, stream flow stabilizers of wire-wrapped rock. The site was determined not eligible for the NRHP in 2004 but was not evaluated for local listing (Dice 2009).

ECORP archaeologist revisited part of the recorded site and noted an additional five features associated with the expanded site boundaries. These include three water diversion structures, each one containing a wall with outward facing granite cobbles for support (Features 17-19). Feature 20 is a steel retaining wall made of heavy steel mesh grate. The steel mesh is held in place by vertical and horizontal sections of roughly-cut railroad track. The horizontal section of railroad track is marked CARNEGIE 1095 ET. One vertical rail section is marked EV STEEL XD. Feature 21 is an east-west trending low retaining wall composed of granite cobbles that are bound in a wire net (Dice 2009).

### Site P-36-015497

Site P-36-015497 is Baseline Road, constructed on the Southern California Baseline, which was surveyed by Col. Henry Washington in 1853. It is registered as California Point of Historical Interest No. 12 (Kaiser 1973). Baseline Road began as a dirt wagon road for freight traffic, and is today a modern, six-lane asphalt-concrete roadway with a landscaped center median. While Baseline Road is historically associated with the Southern California Baseline of 1853, the survey line itself is an imaginary map line, with no physical manifestation of it or the survey markers located within or adjacent to the Project alignment (George and Smallwood 2014).

Table 4 (below) provides a list of the two cultural resources survey reports identified with the Project site and also includes seven additional cultural resources survey reports completed within the half-mile buffer of the proposed Project.

**Table 4. Cultural Resources Survey Reports in the Project and within the ½ mile Buffer**

| Info Center No. | Authors | Title | Year |
|---|---|---|---|
| **SB-00702** | Archaeological Associates | Archaeological Survey Report: UltraSystems Project #4426 | 1978 |
| **SB-00806** | Wilmoth, Stan | Environmental Impact Evaluation: An Archaeological Assessment of Both Sides of Sixteenth Street (Baseline) in the City of Upland, San Bernardino County, California | 1979 |
| **SB-01660** | Gross, Lorraine S., Kevin J. Peter, and William B. Gilmour | Cultural and Paleontological Resource Investigations of the Lakes at San Antonio Project, City of Upland, San Bernardino County, California | 1987 |
| **SB-03558** | Duke, Curt | Cultural Resource Assessment for PBMS Wireless Facility CM 264-02, County of San Bernardino, CA SPP | 2000 |
| **SB-05358** | Sider, W.A. | Cucamonga Creek 1776-1976 After 200 Years | 1976 |
| **SB-06083** | Wlodarski, Robert J. | Bechtel Wireless Telecommunications Site ES0258 (Upland Water Tanks) located at 580 East 15th Street, Upland California 91785 | 2008 |
| **SB-06666** | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System | 2009 |

| | | | |
|---|---|---|---|
| | | Project, Cities of Rancho Cucamonga, Upland, and Ontario, San Bernardino County, California | |
| **SB-06667** | Encarnacion, Deirdre | Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga... | 2009 |
| **SB-08257** | Tang, Bai | Due-Diligence Historical/Archaeological Resources Study Inland Empire Utilities Agency Recharge Basin Maintenance Plan Chino Basin Area, San Bernardino and Riverside Counties, California CRM TECH Contract No. 2989 | 2016 |

### Field Survey

During the field survey, the Project area was carefully examined for the presence of any cultural resources, including prehistoric or historic archaeological sites or historic buildings. No cultural resources were discovered. The survey was conducted by walking parallel transects in an east-west direction. These transects were spaced approximately 10 meters apart. Five shovel-test pits were excavated. The site contains a percolation basin or trench, for water runoff. Constant soil hydration allowed vegetation to grow throughout the border of the site.

### Shovel-test Pits

Five shovel-test pits were excavated to further test for the presence of buried cultural resources deposits within the Project area. The test pits were excavated to a depth of approximately 30 centimeters (cm). No cultural resources (flaked stone, bone, charcoal, historic or prehistoric artifacts [e.g., projectile points, stone tools, shell or stone beads, ceramics, or historic artifacts [e.g., nails, china, etc.]) were discovered. Figure 3 shows the locations of each test pit. Test pit locations were distributed in an east-west orientation and spread across the Project area.

## CONCLUSION AND CULTURAL RESOURCES RECOMMENDATIONS

This cultural study was completed pursuant to CEQA. Field survey investigations were conducted on July 12, 2018 and did not identify any cultural resources, including prehistoric or historic archaeological sites or historic buildings within the project area. Five shovel-test pits were completed on the site and provided no indication of buried cultural resources.

The NAHC was contacted to complete a Sacred Lands File Search of the property, which returned negative results. The NAHC also provided a list of potentially interested parties and affiliated Native American individuals and groups. These individuals were contacted for further outreach and to identify if there were any concerns related to cultural values and resources for the proposed project area. SMBMI advised via email that although the project area lies within Serrano ancestral territory, the location of the project area may not concern the Tribe. A representative from the Gabrieleno Band of Mission Indians - Kizh Nation replied via email to express their interest to consult with the City of Upland regarding the proposed project. Their contact information, as well as a list of Native American Tribal contacts is referenced in Appendix B.

On June 26, 2018, SCCIC conducted a records search for the project area, including a search of the half-mile radius surrounding the property. Although two cultural resources survey reports have been completed within the project area, no cultural resources had been previously discovered. Within the half-mile search radius, site records indicate that seven cultural resources survey reports have been completed, and three cultural resources sites have been documented within this area. Site P-36-000899 consists of a prehistoric scatter of milling artifacts. Site P-36-006255 consists of historic-age wells/cisterns, a water conveyance system a dam, and a wall/fence feature. Site P-36-015497 consists of the historic Baseline Road highway/trail. Thorough investigation within the Project area did not result in discovery or identification of any cultural resources sites or artifacts.

The subject property remains a sensitive area based on previous archaeological and historical findings from the general area, as well as its proximity to the Cajon wash and surrounding traditional Native American land use areas.

If previously undocumented cultural resources are identified during earthmoving activities, a qualified archaeologist should be contacted to assess the nature and significance of the find, diverting construction activities from the location of the discovery. If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her representative, the MLD may inspect the site of discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD shall make recommendations as the manner in which to treat the human remains and any associated offerings.

## REFERENCES


Archaeological Associates
1978 Archaeological Survey Report: UltraSystems Project #4426. On file, South Central Coastal Information Center, California State University, Fullerton.

Basgall, Mark E.
1988 Archaeology of the Komodo Site, an Early Holocene Occupation in Central Eastern California. In *Early Human Occupation in Far Western North America: The Clovis-Archaic Interface*, edited by Judith A. Willig, C. Melvin Aikens, and John L. Fagan, pp. 103–119. Nevada State Museum Anthropological Papers, Vol. 21. Nevada Department of Cultural Affairs, Division of Museums and History, Carson City, Nevada.

1993 *Early Holocene Prehistory of the North-central Mojave Desert*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

2007a Another Look at the Ancient Californians: Resurvey of the Emma Lou Davis Stake Areas and Reassessment of Collections, Naval Air Weapons Station, China Lake, Kern County, California. On file, Naval Air Weapons Station, China Lake, California.

2007b Prehistoric People in an Evolving Landscape: A Sample Survey of the China Lake Basin and its Implications for Paleoindian Land Use. On file, Naval Air Weapons Station, China Lake, California.

2012 Middle Archaic Cultural Adaptations in the Eastern Sierra Nevada: Data Recovery Excavations at CA-INY-1384/H, INY-6249/H, INY-6250, and INY-6251/H. Submitted by Archaeological Research Center, Department of Anthropology, California State University, Sacramento. On file, California Department of Transportation, District 9, Bishop.

Basgall, Mark E. and Mark A. Giambastiani
1995 Prehistoric Use of a Marginal Environment: Continuity and Change in Occupation of the Volcanic Tablelands, Mono and Inyo Counties, California. *Center for Archaeological Research at Davis Publication* 12.

Basgall, Mark E. and Matthew C. Hall
1991 Relationship between Fluted and Stemmed Points in the Mojave Desert. *Current Research in the Pleistocene* 8:61–63.

1992 Fort Irwin Archaeology: Emerging Perspectives on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26(5):1–7.

1994 Status Report on Cultural Resources Management at the National Training Center, Fort Irwin, 1993–1994: An Addendum to the Fort Irwin Historic Preservation Plan. Submitted by Far Western Anthropological Research Group, Inc., Davis, California.

On file, United States Department of Defense, National Training Center, Fort Irwin, California.

2000 Morphological and Temporal Variation in Bifurcate-Stemmed Dart Points of the Western Great Basin. *Journal of California and Great Basin Anthropology* 22(2):237–276.

Basgall, Mark E. and Kelly R. McGuire
1988 The Archaeology of CA-INY-30: Prehistoric Culture Change in the Southern Owens Valley, California. On file, California Department of Transportation, Office of Environmental Analysis, Sacramento.

Bean, Lowell John
1972 *Mukat's People: The Cahuilla Indians of Southern California*. Berkeley: University of California Press.

Bean, Lowell John and Charles Smith
1978 Serrano. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 570-574. Washington: Smithsonian Institution.

Bean, Lowell John, Sylvia Brakke Vane, Michael Lerch, and Jackson Young
1981 *Native American Places in the San Bernardino National Forest*. On file at the Department of Agriculture, United States Forest Service, South Zone Office, Arcadia, California.

Beck, Warren A., and Ynez D. Haase
1974 *Historical Atlas of California*. Oklahoma City: University of Oklahoma Press.

Beck, Charlotte and George T. Jones
1997 The Terminal Pleistocene/Early Holocene Archaeology of the Great Basin. *Journal of World Prehistory* 11(2):161–236.

2010 Clovis and Western Stemmed: Population Migration and the Meeting of Two Technologies in the Intermountain West. *American Antiquity* 75(1):81–116.

Bedwell, Stephen F.
1970 *Prehistory and Environment of the Pluvial Fork Rock Lake Area of South-Central Oregon*. Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene.

Benedict, Ruth
1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3):366-392.

Bettinger, Robert L.
1978 Alternative Adaptive Strategies in the Prehistoric Great Basin. *Journal of Anthropological Research* 34(1):27–46.

Bettinger, Robert L. and Martin A. Baumhoff
1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47(3):485–503.

Bettinger, Robert L. and R. Ervin Taylor
1974 Suggested Revisions in Archaeological Sequences of the Great Basin and Interior Southern California. *Nevada Archaeological Survey Research Papers* 5:1–26. Reno, Nevada.

Blackburn, Thomas C. and Lowell John Bean
1978a Kitanemuk. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 564-569. Washington: Smithsonian Institution.

1978b Serrano. In Handbook of North American Indians, Volume 8, *California*, Robert F. Heizer, editor, pp. 570-574. Washington: Smithsonian Institution.

Borden, Ferris W.
1971 The Use of Surface Erosion Observations to Determine Chronological Sequence in Artifacts from a Mohave Desert Site. *Archaeological Survey Association of Southern California Papers* 7.

Bryan, Alan L.
1988 The Relationship of the Stemmed Point and Fluted Point Traditions in the Great Basin. *Nevada State Museum Anthropological Papers* 22:53–74.

Byrd, Brian F., and Micah Hale
2003 Lacustrine Lifestyles along Owens Lake: National Register Historic Places (NRHP) Evaluation of 15 Prehistoric Sites for the Olancha/Cartago Four-Lane Project, United States Route 395, Inyo County, California. On file, California Department of Transportation, District 6, Fresno.

Campbell, Elizabeth W. Crozer
1931 An Archaeological Survey of the Twenty-Nine Palms Region. *Southwest Museum Papers* 7:1-93.

Campbell, Elizabeth W. Crozer and William H. Campbell
1935 The Pinto Basin Site: An Ancient Aboriginal Camping Ground in the California Desert. *Southwest Museum Papers* 9:1-51.

Campbell, Elizabeth W. Crozer, Ernst Antevs, Charles E. Amsden, Joseph A. Barbieri, and Francis D. Bode
1937 The Archaeology of Pleistocene Lake Mohave: A Symposium. *Southwest Museum Papers* 11.

Clewlow, C. William, Jr., Robert F. Heizer, and Rainer Berger
1970 An Assessment of the Radiocarbon Dates for the Rose Spring Site (CA-Iny-372), Inyo County, California. In Papers on Anthropology in the Great Basin, pp. 19-27. *University of California Archaeological Research Facility Contributions* 7.

Crowley, S.
1975 Site Record for P-36-000899. On file, South Central Coastal Information Center, California State University, Fullerton.

Davis, Emma Lou
1978 The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country. *Natural History Museum of Los Angeles County,* Science Series 29. Los Angeles.

Davis, James T.
1996 Trade Routes and Economic Exchange among the Indians of California. Berkeley: *University of California Archaeological Survey Reports* No. 54.

Drucker, Philip
1937 Culture Element Distributions V: Southern California. *University of California Anthropological Records* 1(1):1-52. Berkeley.

Earle, David D.
1990 New Evidence on the Political Geography of the Antelope Valley and Western Mojave Desert at Spanish Contact. In Archaeology and Ethnohistory of Antelope Valley and Vicinity, edited by Bruce Love and William H. DeWitt, pp. 87-104. *Antelope Valley Archaeological Society Occasional Papers* Number 2.

2005a The Mojave River and the Central Mojave Desert: Native Settlement, Travel, and Exchange in the Eighteenth and Nineteenth Centuries. *Journal of California and Great Basin Anthropology* 25(1):1-38.

2005b Chemehuevi Population Movements and the Numic Frontier in the Western and Central Mojave Desert after European Contact. In Papers in Antelope Valley Archaeology and Anthropology edited by Roger W. Robinson, pp. 135-146. *Antelope Valley Archaeological Society Occasional Papers* Number 4.

Delacorte, Michael G.
1994 Late Prehistoric Resource Intensification in the Numic Heartland. Paper presented at the 24th Annual Great Basin Anthropological Conference, Elko, Nevada.

1995 Desert Side-notched Points as a Numic Population Marker in the West-Central Great Basin. Paper presented at the 29th Annual Meeting of the Society for California Archaeology, Eureka, California.

Dice, Michael H
2009 Site Record for P-36-0006255. On file, South Central Coastal Information Center, California State University, Fullerton.

Driver, Harold E
1937 Culture Element Distributions, VI: Southern Sierra Nevada. *University of California Anthropological Records* 1(2):53–154. Berkeley.

Duke, Curt
2000 Cultural Resource Assessment for PBMS Wireless Facility CM 264-02, County of San Bernardino, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Eerkens, Jelmer W.
2004 Privatization, Small-Seed Intensification, and the Origins of Pottery in the Western Great Basin. *American Antiquity* 69:653-670.

Elston, Robert G.
1982 Good Times, Hard Times: Prehistoric Culture Change in the Western Great Basin. In Man and Environment in the Great Basin, edited by David B. Madsen and James F. O'Connell, pp. 186 206. *Society for American Archaeology Papers* No. 2, Washington, D.C.

Encarnacion, Deirdre
2009 Identification and Evaluation of Historic Properties: Northwest Recycled Water System Project, Cities of Rancho Cucamonga, Upland and Ontario, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Farmer, Malcolm F.
1935 The Mojave Trade Route. *Masterkey* 9(5):154-157.

Fenenga, Gerrit
2013 Clovis Blade Technology at the Witt Site, Tulare Lake, California. Paper presented to the Sacramento Archaeology Society, West Sacramento California.

Fitzgerald, Richard T., Terry L. Jones, and Adella Schroth
2005 Ancient Long-distance Trade in Western North America: New AMS Radiocarbon Dates from Southern California. *Journal of Archaeological Science* 32(3):423–434.

Fowler, Catherine
1972 Some Ecological Clues to Proto-Numic Homelands. In Great Basin Cultural Ecology: A Symposium, Don D. Fowler, editor, pp. 105-122. *Desert Research Institute Publication in the Social Sciences* 8, Reno.

Garfinkel, Alan P.
2006 Paradigm Shifts, Rock Art Theory, and the Coso Sheep Cult of Eastern California. *North American Archaeologist* 27(3):203-244.

2007 Archaeology and Rock Art of the Eastern Sierra and Great Basin Frontier. *Maturango Museum Publication* 22. Maturango Museum, Ridgecrest, California.

Garfinkel, Alan P. and Donald R. Austin
2011 Reproductive Symbolism in Great Basin Rock Art: Bighorn Sheep Hunting, Fertility, and Forager Ideology. *Cambridge Archaeological Journal* 21(3):453-471.

Garfinkel, Alan P., Donald R. Austin, David Earle, and Harold Williams
2009 Myth, Ritual and Rock Art: Coso Decorated Animal-Humans and the Animal Master. *Rock Art Research* 26(2):179-197.

Garfinkel, Alan P., Jerry N. Hopkins, and Craig E. Skinner
2008 Ancient Stones of Black Glass: Tracing and Dating Paleoindian Obsidian Artifacts from China and Tulare Lakes. In *Contributions to Tulare Lake Archaeology IV: Ice-age Stone Tools from the San Joaquin Valley,* edited by Jerry N. Hopkins and Alan P. Garfinkel, pp. 59-97. Coyote Press Publications, Salinas, California.

Garfinkel, Alan P., Geron Marcom, and Robert A. Schiffman
2007 Culture Crisis and Rock Art Intensification: Numic Ghost Dance Paintings and Coso Representational Petroglyphs. *American Indian Rock Art* 33:83-103.

Garfinkel, Alan P., Robert A. Schiffman and Kelly R. McGuire
1980 Archaeological Investigations in the Southern Sierra Nevada: The Lamont Meadow and Morris Peak Segments of the Pacific Crest Trail. *Cultural Resources Publications, Archaeology*. Department of the Interior, Bureau of Land Management, Bakersfield District, Bakersfield, California.

Garfinkel, Alan P. and Harold Williams
2011 *Handbook of the Kawaiisu: A Sourcebook and Guide to Primary Resources on the Native Peoples of the far southern Sierra Nevada, Tehachapi Mountains, and southwestern Great Basin*. Wa-hi Sina'avi Publications, Bakersfield, California.

2015 *The Handbook of the Kawaiisu: A Sourcebook and Guide to Primary Resources on the Native Peoples of the far southern Sierra Nevada, Tehachapi Mountains, and southwestern Great Basin*. Revised Second Edition. Wa-hi San'avi Publications and the Tehachapi Heritage League, Tehachapi, California.

Garfinkel, Alan P., David A. Young, and Robert M. Yohe
2010 Rock Art, Resource Depression, and Ritual Bighorn Hunting in the Coso Range of Eastern California: A Simulation Model. *Journal of Archaeological Science* 37:42-51.

George, Joan, and Josh Smallwood
2014 Phase I Cultural Resources Assessment for the Etiwanda Pipeline North Liner Repair Project, Cities of Fontana and Rancho Cucamonga, San Bernardino County, California. Prepared for Helix Environmental Planning, La Mesa, CA. On file, South Central Coastal Information Center, California State University, Fullerton.

Giambastiani, Mark A.
2008 An Archaeological Survey of 10,121 Acres in the Spangler Hills Open Area and on Adjacent Lands within Searles Valley, Inyo County, California. On file, Bureau of Land Management, Ridgecrest, California.

2011 An Archaeological Inventory of Approximately 2,700 Acres in the Lost Cabin, Water Canyon, and Pyramid Point Areas, North and South Ranges, Naval Air Weapons Station, China Lake, Inyo and San Bernardino Counties, California. Submitted by

ASM Affiliates, Inc., Reno, Nevada. On file, Environmental Planning and Management Department, Naval Air Weapons Station, China Lake, California.

Giambastiani, Mark A. and Thomas Bullard
2010 Terminal Pleistocene-Early Holocene Occupations on the Eastern Shoreline of China Lake, California. *Pacific Coast Archaeological Society Quarterly* 43 (1-2):50-70.

Gifford, Edward
1918 Clans and Moieties in Southern California. *University of California Publications in American Archaeology and Ethnology* 23(1):1-122.

Gilreath, Amy J.
2007 Rock Art in the Golden State: Pictographs and Petroglyphs, Portable and Panoramic. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 273-290. Alta Mira Press, New York.

Gilreath, Amy J. and William R. Hildebrandt
1997 Prehistoric Use of the Coso Volcanic Field. *Contributions of the University of California No.* 56. University of California, Berkeley.

2008 Coso Rock Art within its Archaeological Context. *Journal of California and Great Basin Anthropology* 28(1):1–22.

2011 Current Perspectives on the Production and Conveyance of Coso Obsidian. In *Perspectives on Prehistoric Trade and Exchange in California and the Great Basin*, edited by Richard E. Hughes, pp. 171–188. University of Utah Press, Salt Lake City.

Goebel, Ted, Michael R. Waters, and Dennis H. O'Rourke
2008 The Late Pleistocene Dispersal of Modern Humans in the Americas. *Science* 319(5869):1497–1502.

Gold, Alan (Garfinkel)
2005 Linguistic Archaeology: Prehistoric Population Movements and Cultural Identity in the Southwestern Great Basin and far southern Sierra Nevada. Ph.D. dissertation. Department of Prehistoric Forager Ecology. University of California, Davis.

Goldsmith, Paul and Alan P. Garfinkel
2013 *Talking Stone: Rock Art of the Cosos.* E-book, documentary film and photographic archive. Bradshaw Foundation, London.

Grant, Campbell, James. W. Baird, and J. Kenneth. Pringle
1968 Rock Drawings of the Coso Range, Inyo County, California: An Ancient Sheep-hunting Cult Pictured in Desert Rock Carvings. *Maturango Museum Publication* 4. China Lake, California.

Grayson, Donald K.
2011 *The Great Basin: A Natural Prehistory.* Revised and expanded edition. University of California Press, Berkeley.

Gross, Lorraine S., Kevin J. Peter and William B. Gilmour
1987 Cultural and Paleontological Resource Investigations of the Lakes at San Antonio Project, City of Upland, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

Hammond, Steve
1989 Site Record for P36-000625. On file, South Central Coastal Information Center, California State University, Fullerton.

Harrington, John P.
1986 *John P. Harrington Papers, Volume 3: Southern California / Basin*. Washington: Smithsonian Institution, National Anthropological Archives. [Microfilm edition, Millwood, New York, Kraus, International Publications].

Harrington, Mark R.
1948a An Ancient Site at Borax Lake, California. *Southwest Museum Papers* 16. Southwest Museum, Los Angeles.

1948b A New Pinto Site. *Masterkey* 22(4):116-118.

1949 A New Pinto Site at Little Lake. *Masterkey* 23(5):135-136.

1950a Pinto Man at Little Lake. *Desert Magazine* 13(11):22-24. Los Angeles.

1950b A Storage Cave Near Walker Pass. *Masterkey* 24(3):89-90.

1951 A Colossal Quarry. *Masterkey* 25(1):15-18.

1952 The Fossil Falls Site. *Masterkey* 26(6):191-195.

1953 A Cave Near Little Lake. *Masterkey* 27(3):77-82.

1957 A Pinto Site at Little Lake, California. *Southwest Museum Papers* No. 17.

Haynes, Gregory M.
2004 An Evaluation of the Chronological Relationship between Great Basin Stemmed and Pinto Series Projectile Points in the Mojave Desert. In *Proceedings of the Millennium Conference: The Human Journey and Ancient Life in California's Deserts: Proceedings from the 2001 Millennium Conference*, edited by Mark W. Allen and Judyth Reed, pp. 117–128. Maturango Museum Publication Number 15, Ridgecrest, California.

Hedges, Ken
2001 Traversing the Great Gray Middle Ground: An Examination of Shamanistic Interpretations of Rock Art. *American Indian Rock Art* 27:123–136.

Heizer, Robert F. and Martin A. Baumhoff
1961 The Archaeology of Wagon Jack Shelter. *University of California Anthropological Records* 20(4):119-138. Berkeley.

Heizer, Robert F., Martin A. Baumhoff, and C. William Clewlow, Jr.
1968 Archaeology of South Fork Shelter (NV-EL-11), Elko County, Nevada. *University of California Archaeological Survey Reports* 71:1-58. Berkeley.

Heizer, Robert F. and Thomas R. Hester
1978 Great Basin. In *Chronologies in New World Archaeology*, edited by R. Ervin Taylor and Clement W. Meighan, pp. 147-199. Academic Press, New York.

Hildebrandt, William R. and Kelly R. McGuire
2002 The Ascendance of Hunting during the California Middle Archaic: An Evolutionary Perspective. *American Antiquity* 67(2):231–256.

ICF International
2013 Archaeological Survey Report for the High Desert Corridor, Los Angeles and San Bernardino Counties, California, 07-LA/ 08-SBD, SR-14 to SR-18. EA 116720. On file, South Central Coastal Information Center, California State University, Fullerton.

Johnson, John R. and Joseph G. Lorenz
2006 Genetics, Linguistics, and Prehistoric Migrations: An Analysis of California Indian Mitochondrial DNA Lineages. *Journal of California and Great Basin Anthropology* 26(1):33-64.

Justice, Noel D.
2002 *Stone Age Spear and Arrow Points of California and the Great Basin*. Indiana University Press, Bloomington, Indiana.

Kaiser, Kathryn H.
1973 Point of Historical Interest, "Baseline Road". On file, South Central Coastal Information Center, California State University, Fullerton.

Kelly, Robert L.
1983 Hunter-Gatherer Mobility Strategies. *Journal of Anthropological Research* 39:277–306.

1985 *Hunter-Gatherer Mobility and Sedentism: A Great Basin Study*. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

1988 Three Sides of a Biface. *American Antiquity* 53:717–734.

King, Chester
2003 *Japchibit Ethnohistory*. On file at the United States Department of Agriculture, Angeles National Forest.

Kroeber, Alfred. L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington, D.C.

Kyle, D.E.
1990 *Historic Spots in California*. Palo Alto: Stanford University Press.

Lamb, Sydney
1958 Linguistic Prehistory in the Great Basin. *International Journal of American Linguistics* 24(2):95–100.

Lanning, Edward P.
1963 The Archaeology of the Rose Spring Site (INY-372). *University of California Publications in American Archaeology and Ethnology* 49(3):327–336. Berkeley.

Leakey, Louis S. B., Ruth D. Simpson, and Thomas Clements
1968 Excavations at Nine Prehistoric Sites in in the Calico Mountains, California: Preliminary Report. *Science* 160:1022–1033.

Lengner, Kenneth R.
2013 *A Prehistory and History of the Death Valley Region's Native Americans and the Environments IN Which They Lived*. Deep Enough Press, Pahrump, Nevada.

McGuire, Kelly R. and Alan P. Garfinkel
1976 The Development of Pinyon Exploitation in Central Eastern California. *The Journal of California Anthropology* 3(2):83–85.

1980 Archaeological Investigations in the Southern Sierra Nevada: The Bear Mountain Segment of the Pacific Crest Trail. *Cultural Resources Publication, Archaeology*. Bureau of Land Management, Bakersfield, California. Reprinted by Coyote Press, Salinas, California.

McGuire, Kelly R., Alan P. Garfinkel, and Mark E. Basgall
1982 Archaeological Investigations in the El Paso Mountains of the Western Mojave Desert: The Bickel and Last Chance Sites, CA-Ker-250, -261. On file, Bureau of Land Management, Ridgecrest, California.

McGuire, Kelly R. and William R. Hildebrandt
2005 Re-thinking Great Basin Foragers: Prestige Hunting and Costly Signaling During the Middle Archaic Period. *American Antiquity* 70:695–712.

Mehringer, Peter J., Jr. and J. C. Sheppard
1978 Holocene History of Little Lake, Mojave Desert, California. In *The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country*, edited by Emma Lou Davis, pp. 153-166. Natural History Museum of Los Angeles County, Science Series 29.

Meyer, Jack and Jeffrey S. Rosenthal
2010 Filling the Middle Holocene Gap. *California Archaeology* 2(2):279–283.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moratto, Michael, Garfinkel, Alan P., Robert M. Yohe, II, Alexander K. Rogers, Tim R. Carpenter, Craig Skinner, Jeff Rosenthal, Michael F. Rondeau, and Jon M. Erlandson
2018 Clovis in the Far West: Classification and Chronology of Western Fluted and End-thinned Points from the Rose Valley Sites, Inyo County, California. *Journal of California Archaeology* 10(1):27-60.

O'Connell, J. F.
1967 Elko Eared/Elko Corner-notched Projectile Points as Time Markers in the Great Basin. *University of California Archaeological Survey Reports* 70:129-140. Berkeley.

Robinson, Roger
1977 The Prehistory of the Antelope Valley, California. An Overview. *Kern County Archaeological Society Journal* 1:43-48.

Rogers, Malcolm J.
1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. *San Diego Museum of Man Archaeological Papers* 3. San Diego, California.

1966 How Stones Became Tools and Weapons. In *Ancient Hunters of the Far West*, pp. 139–192. Union-Tribune Publishing Company, San Diego.

Rondeau, Michael, Jim Cassidy, and Terry L. Jones
2007 Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/ Microblade Complex. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 63-70. Alta Mira Press, Lanham, Maryland.

Sample, L. L.
1950 Trade and Trails in Aboriginal California. Berkeley: *University of California Archaeological Survey Reports* 8.

Schneider, Joan S., H. C. L. Brewer, and Matthew C. Hall
2000 Research, Inventory, and Management Strategies for At-Risk and Other Prehistoric Cultural Resources, Death Valley National Park, California: Program Design Report. On file, Eastern California Information Center, University of California, Riverside.

Schroth, Adella B.
1994 *The Pinto Point Controversy in the Western United States*. Ph.D. dissertation, Department of Anthropology, University of California, Riverside, California.

Schuiling, Walter C.
1984 *San Bernardino County: Land of Contrasts*. Windsor Publications, Woodland Hills, California.

Shott, Michael J.
1986 Technological Organization and Settlement Mobility: An Ethnographic Examination. *Journal of Anthropological Research* 42(1):15–51.

1989 On Tool-Class Use Lives and the Formation of Archaeological Assemblages. *American Antiquity* 54(1):9–30.

Sider, W.A.
1976 Cucamonga Creek 1776-1976 after 200 Years. On file, South Central Coastal Information Center, California State University, Fullerton.

Stewart, Richard, Russell Kaldenberg, and Alexander Rogers
2005 Petroglyphs as Story-Boards: Providing Text for Ritual and Tradition and Recounting the "Power" Experience. In Something Resembling an Archaeologist: Papers in Memory of Paul H. Ezell, edited by Russell Kaldenberg. *San Bernardino County Museum Quarterly* 54(4):209-220. San Bernardino County Museum; Redlands,

Strong, William Duncan
1929 Aboriginal Society in Southern California. *University of California Publications in American Archaeology and Ethnology* 26(1):1-358.

Sutton, Mark Q.
1980 Some Aspects of Kitanemuk Prehistory. *Journal of California and Great Basin Anthropology* 2(2):214-225.

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen
2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture and Complexity* edited by Terry L. Jones and Kathryn A. Klar, pp. 229-246. Alta Mira Press, New York.

Tang, Bai
2016 Due-Diligence Historical/Archaeological Resources Study Inland Empire Utilities Agency Recharge Basin Maintenance Plan Chino Basin Area, San Bernardino and Riverside Counties, California CRM TECH Contract No. 2989. On file, South Central Coastal Information Center, California State University, Fullerton.

Thomas, David H.
1981 How to Classify the Projectile Points from Monitor Valley, Nevada. *Journal of California and Great Basin Anthropology* 3(1):7-43.

1983a The Archaeology of Monitor Valley 1: Epistemology. *Anthropological Papers of the American Museum of Natural History* 58(1). American Museum of Natural History, New York.

1983b The Archaeology of Monitor Valley 2: Gatecliff Shelter. *Anthropological Papers of the American Museum of Natural History* 59(1). American Museum of Natural History, New York.

Ugan, Andrew S. and Jeffrey S Rosenthal
2013a Archaeological Testing and National Register Evaluations of 40 Sites within Airport Lake, Charlie, and George Target Ranges, Naval Air Weapons Station China Lake, Inyo and Kern Counties, California. Submitted by Far Western Anthropological Research Group, Inc., Davis, California. On file, Naval Facilities Engineering Command, Southwest Division, San Diego, California.

Van Tilburg, Jo Anne, Gordon E. Hull, and John C. Bretney (editors)
2012 *Rock Art at Little Lake: An Ancient Crossroads in the California Desert*. Cotsen Institute of Archaeology, University of California, Los Angeles.

Vaughan, Sheila J. and Claude N. Warren
1987 Toward a Definition of Pinto Points. *Journal of California and Great Basin Anthropology* 9:199–213.

Wallace, William J.
1962 Prehistoric Cultural Development in the Southern Californian Deserts. *American Antiquity* 28(2):172–180.

Warren, Claude N.
1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2):168–185.

1984 The Desert Region. In *California Archaeology*, by Michael J. Moratto, pp. 339–430. Academic Press, Orlando, Florida.

1986 Projectile Points. *In Flood, Sweat, and Spears in the Valley of Death: Site Survey and Evaluation in Tiefort Basin, Fort Irwin, California*, edited by Dennis L. Jenkins, pp. 195–218. Coyote Press, Salinas, California.

2008 The Age of Clovis Points at China Lake, California. In Avocados to Millingstones: Papers in Honor of D. L. True, edited by Georgie Waugh and Mark E. Basgall. *Monographs in California and Great Basin Anthropology* Vol. 5, Archaeological Research Center, Department of Anthropology, California State University, Sacramento.

Warren, Claude N. and Robert H. Crabtree
1986 Prehistory of the Southwestern Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 183–193. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.

Warren, Claude N. and Joan S. Schneider
2003 Pleistocene Lake Mojave Stratigraphy and Associated Cultural Material. *Proceedings of the Society for California Archaeology* 16:61–74.

Warren, Claude N., Delbert Leroy True and A. A. Eudey
1961 Early Gathering Complexes of Western San Diego County: Results and Interpretations of an Archaeological Survey. *University of California, Los Angeles, Archaeological Survey Annual Report* 1960-1961:1-106.

Waters, Michael R. and Thomas W. Stafford
2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* 315:1122–1126.

Waters, Michael R., Thomas W. Stafford, H. G. McDonald, C. Gustafson, M. Rasmussen, E. Cappellini, J. V. Olsen, D. Szklarczyk, L. J. Jensen, M. Thomas P. Gilbert, and E. Willerslev
2011 Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington. *Science* 334:351–353.

Whitley, David S.
1987 Comment on the Signs of All Times by J. D. Lewis-Williams and T. A. Dowson. *Current Anthropology* 29(2):238.

1998 History and Prehistory of the Coso Range: The Native American Past on the Western Edge of the Great Basin. In *Coso Rock Art: A New Perspective*, edited by Eva Younkin, pp. 29-68. Ridgecrest: Maturango Press.

2003 What is Hedges Arguing About? *American Indian Rock Art* 29:83-104.

Whitley, David S. and Ronald I. Dorn
1987 Rock Art Chronology in Eastern California. *World Archaeology* 19:150-164.

2010 The Coso Petroglyph Chronology. *Pacific Coast Archaeological Society Quarterly* 43: 135-157.

Wigand, Peter E. and Rhode, David
2002 Great Basin Vegetation history and aquatic systems: The last 150,000 years. In *Great Basin Aquatic Systems History*, edited by R. Hershler, David R. Madsen, and D. R. Currey, Smithsonian Contributions to the Earth Sciences 33:309.

Willig, Judith A. and C. Melvin Aikens
1988 The Clovis-Archaic Interface in Far Western North America. In Early Human Occupation in Western North America: The Clovis-Archaic Interface, edited by Judith A. Willig, C. Melvin Aikens and John L. Fagan, pp. 1–40. *Nevada State Museum Anthropological Papers.* Vol. 21. Carson City, Nevada.

Wilmoth, Stan
1979 Environmental Impact Evaluation: An Archaeological Assessment of Both Sides of Sixteenth Street (Baseline) in the City of Upland, San Bernardino County, California. On file, South Central Coastal Information Center, California State University, Fullerton.

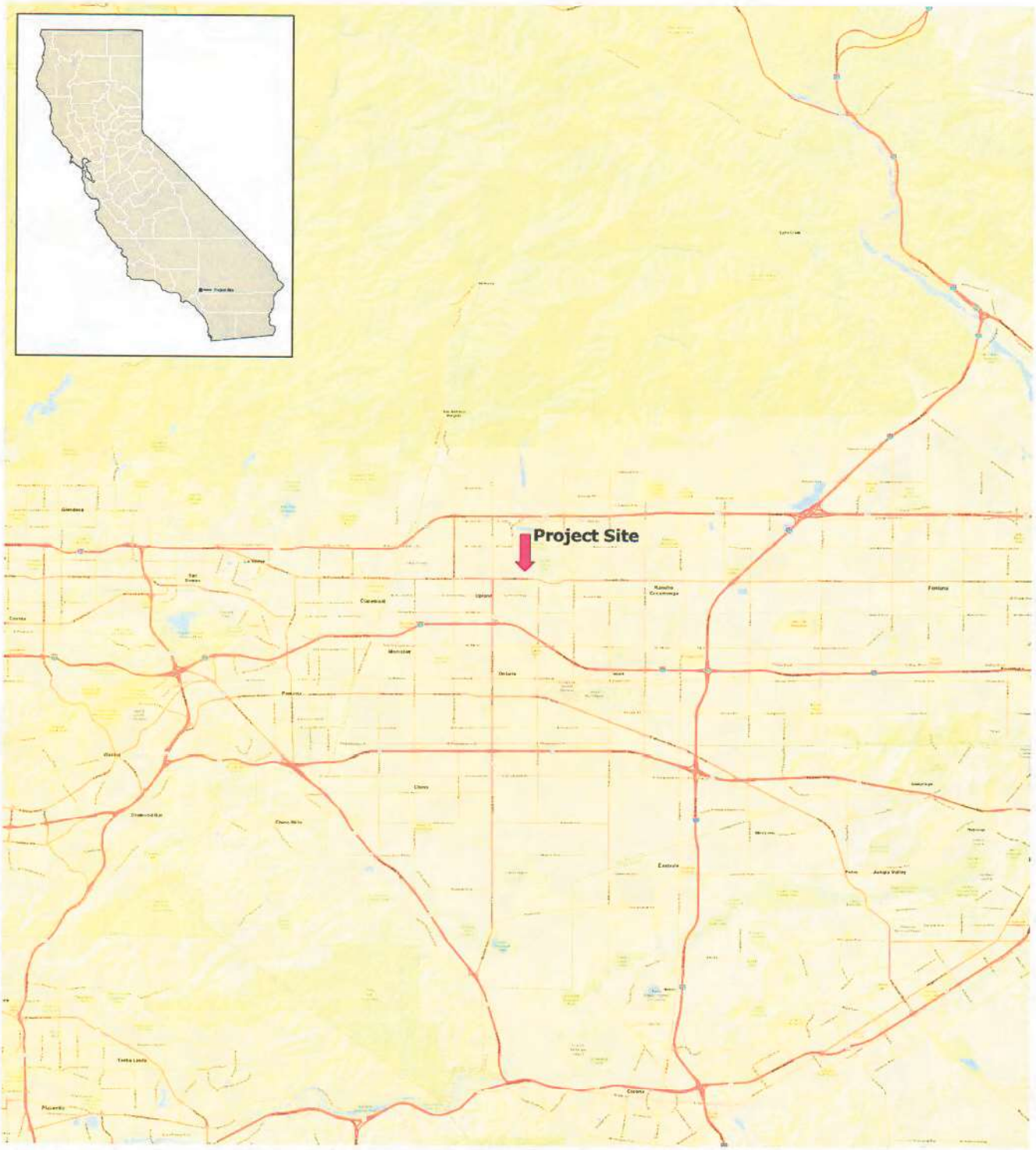
Wlodarski, Robert J.
2008 Bechtel Wireless Telecommunications Site ES0258 (Upland Water Tanks) located at 580 East 15th Street, Upland, California 91785. On file, South Central Coastal Information Center. California State University, Fullerton.

Yohe, Robert, II
1992 A Re-evaluation of Western Great Basin Cultural Chronology and Evidence for the Timing of the Introduction of the Bow and Arrow to Eastern California Based on New Excavations at the Rose Spring Site (CA-INY-372). Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

# APPENDIX A
# FIGURES

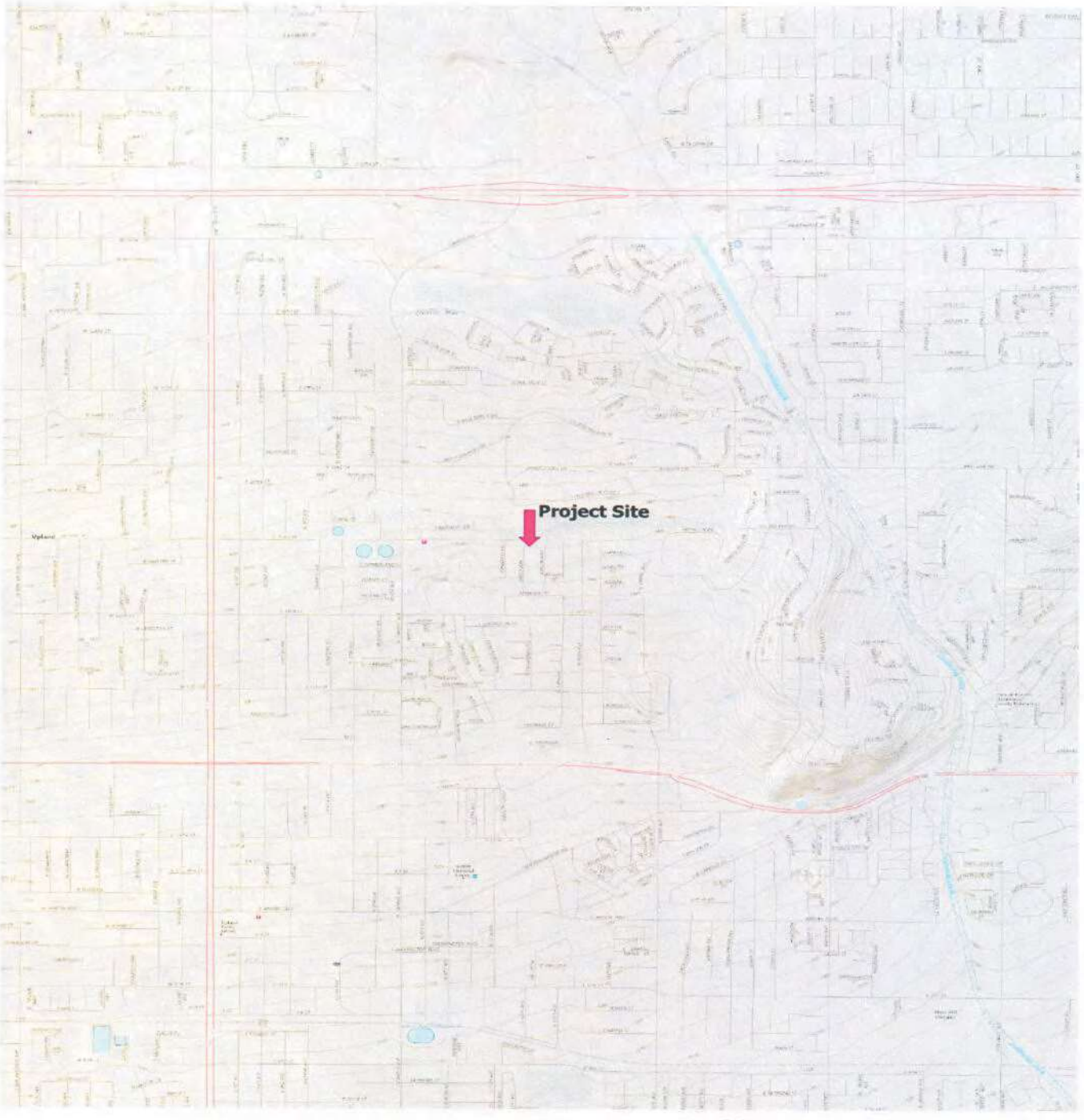
# Figure 1

Regional Vicinity Map



# Figure 2

Topographic Map

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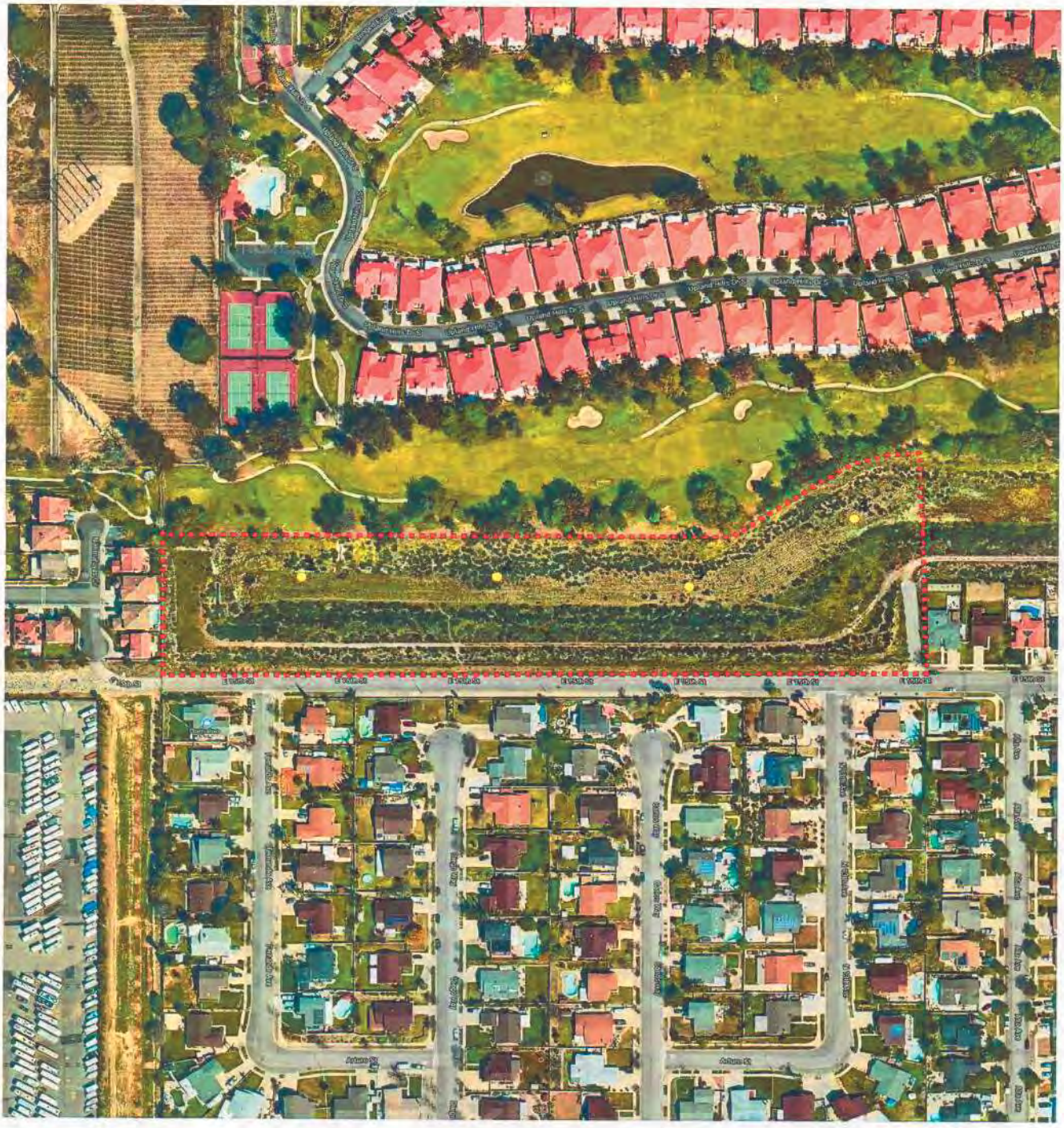
# Figure 3

Cultural Shovel Test Pit Locations



0.025 0 0.025 0.05 0.075 mi

Legend

- Property Border
- Cultural Shovel Test Pits

N

RCA ASSOCIATES, INC

# SITE PHOTOS



View North



View East



View West



Channel Water

# APPENDIX B
# NATIVE AMERICAN CONSULTATION

# Sacred Lands File & Native American Contacts List Request

**Native American Heritage Commission**
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

*Information Below is Required for a Sacred Lands File Search*

**Project** Frontier communities development

**County:** San Bernardino

**USGS Quadrangle Name:** Ontario, California 2015 7.5 USGS

**Township:** 1 south **Range:** 7 west **Section(s):** 5

**Company/Firm/Agency:** RCA Associates/ Frontier Communities/ City of Upland

**Street Address:** APNs (1045-151-34) (1045-121-02) (0207-483-46) North of 15th street

**City:** Upland **Zip:** 92407

**Phone:** 760-596-0017

**Fax:** 760-956-9212

**Email:** alinalanda@ymail.com

**Project Description**: Frontier Homes development on a currently vacant real estate property approximately 9.16 acres.

STATE OF CALIFORNIA — Edmund G. Brown, Jr., Governor

**NATIVE AMERICAN HERITAGE COMMISSION**
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

June 15, 2018

Alina Landa
RCA Associates

Sent by E-mail: alinalanda@ymail.com

RE: Proposed Frontier Communities Upland Colonies 59 Development Project, City of Upland Ontario USGS Quadrangle, San Bernardino County, California

Dear Ms. Landa:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

**CONFIDENTIALITY NOTICE:** This communication with its contents may contain confidential and/or legally privileged information. It is solely for the use of the intended recipient(s). Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

**Native American Heritage Commission**
**Native American Contact List**
**San Bernardino County**
**6/15/2018**

***Gabrieleno Band of Mission Indians - Kizh Nation***
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

***Gabrieleno/Tongva San Gabriel Band of Mission Indians***
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

***Gabrielino /Tongva Nation***
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

***Gabrielino Tongva Indians of California Tribal Council***
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

***Gabrielino-Tongva Tribe***
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

***Morongo Band of Mission Indians***
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

***Morongo Band of Mission Indians***
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

***Pauma Band of Luiseno Indians - Pauma & Yuima Reservation***
Temet Aguilar, Chairperson
P.O. Box 369 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com

***San Fernando Band of Mission Indians***
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk, Serrano, Tataviam
Newhall, CA, 91322
Phone: (503) 539 - 0933
Fax: (503) 574-3308
ddyocum@comcast.net

***San Manuel Band of Mission Indians***
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov

***Serrano Nation of Mission Indians***
Goldie Walker, Chairperson
P.O. Box 343 — Serrano
Patton, CA, 92369
Phone: (909) 528 - 9027

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Frontier Communities Upland Colonies 59 Development Project, San Bernardino County.

RCA

15555 Main Street, #D4-235
Hesperia, California 92345
(760) 956-9212 fax (760) 244-0791
rca123@aol.com
www.rcaassociatesllc.com

June 21, 2018

Donna Yocum, Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, CA 91322

Dear Ms. Yocum,

I am writing you to bring to your attention a proposed project in compliance with CEQA and the City of Upland, California. The proposed project is located on APNs (1045-151-34) (1045-121-02) and (0207-483-46). (Township 1 south, Range 7 west, Section 5) Ontario, California USGS 2015. The proposed project by Frontier Communities is to construct single-family home developments located north of 15th street.

As part of the cultural resources study for the project, I am requesting your insight on potential Native American cultural properties and resources in or near the area of potential effect. Please respond at your earliest convenience if you have any information to consider for this study. Thank you.

Respectfully,

Alina Landa
Cultural Resources Specialist
RCA Associates, Inc.
alinalanda@ymail.com

# RESUMES

Dr. Alan Philip Garfinkel Gold, R.P.A.
avram1952@yahoo.com
805.312.2261

**Positions:**

Principal Archaeologist
RCA Associates, LLC
Hesperia, California

Founder and Director
California Rock Art Foundation
http://www.carockart.org

Senior Cultural Resource Specialist
AECOM (http://www.aecom.com)
Camarillo, California (Total time 3 years)

Freelance Cultural Resource Management Consultant
(Total time 20 years)

Environmental Planner, Cultural Resources
California Department of Transportation
(Total time 18 years)

**Education:**

Bachelor of Arts, Department of Anthropology, California State University, Northridge, (*magna cum laude*), 1974
Master of Arts, Department of Anthropology, University of California, Davis, 1977
Doctor of Philosophy, Prehistoric Forager Ecology, University of California, Davis, 2005

**Representative Cultural Resource Management Projects**

Cultural Resource Management Director for North Sky Wind Energy Project. Identified 76 cultural resource sites. Collected, excavated and documented sites including intensive data recovery effort resulting in a collection of 5,000 artifacts. Managed up to 25 Native American Monitors concurrently for the 102 wind turbine 15,000 acre study area. Resulted in project approval through NEPA and CEQA complaince and approved federal tax credit. Senior author for the resulting 2,769 page report.

Identification and evaluation of potential effects for the Red Rock Canyon Bridge Replacement Project. Identified and evaluated historic properties within the project area, developed historic background for the Red Rock Railroad historic resource. Completed Historic Property Survey Report including the documentation of identification (Prehistoric Archaeological and Historic Archaeological Survey) and evaluation efforts (Geoarchaeological Study). Consultation completed with local museums, Red Rock Canyon State Park, Native American Heritage Commission (NAHC) and Native American groups identified. Area had been listed as a Sacred Site by NAHC. Result: no historic properties within area of potential effects (APE).

Black Creek Site (CA-CAL-789) eligibility evaluation, testing, data recovery, and public interpretation. Contracted with Far Western and Sonoma State for data recovery and construction phase of systematic late discovery identification. Coordinated and consulted with Advisory Council, State Historic Preservation Office, the Army Corps of Engineers, and the Calaveras Band of Mi-Wuk. Significant and eligible site fully mitigated from adverse effects

of road realignment through data recovery and public interpretation projects that included website, interpretive booklet, public presentations at conferences and public schools.
Project received California Governor's Award for Historic Preservation in 2008.

The Applegate Site (CA-AMA-56) eligibility, data recovery, negotiation of reburial arrangement with the Ione Band of the Miwok, presentation of history and character of cultural resource studies in public program sponsored by Far Western Anthropological Research Group, State Historic Preservation Office, California Department of Transportation, and the Ione Band of the Miwok. Worked out program for dealing with eligible site that had received impacts from Caltrans over the course of 50 years of impacts. Dealt with major issues with human remains and associated mortuary offerings.

East Sonora Bypass archaeological studies. Developed program to mitigate adverse effects of numerous eligible historic and prehistoric archaeological sites. Consultation with Mi-Wuk on one of the most controversial Caltrans projects in the history of their cultural resource program due to the pattern of late discoveries and lack of thorough consultation with Native Americans. Coordination with State Historic Preservation Office concerning Memorandum of Agreement, Data Recovery Program, Programmatic Agreement, and Treatment Plan, Supplemental Historic Property Survey Report.

Development of a management plan and National Register nomination for the Fossil Falls/Little Lake Archaeological District for the Bureau of Land Management. Resulted in protective actions, road closures, interpretation, and identification of resources for inclusion in the National Register nomination and the resulting report was published by the Bakersfield District Office of the Bureau of Land Management.

Project Archaeologist with the Desert Planning Staff, Bureau of Land Management, Riverside, California.

Alina Landa
alinalanda@ymail.com
(909) 543-9442

## Experience

**RCA Associates, Inc., Victorville, California** **January 2017-Present**
**Cultural Resources Specialist**

Survey properties in the California high desert region. Correspond with Native American Tribes. Contact Native American Heritage Commission and California Historical Resources Information Center. Prepare CEQA Phase I cultural reports under a certified archaeologist.

## Education

**Cal Poly Pomona, Pomona, California** **June 2016**
Bachelor of Science, General Anthropology
Cultural Resource Management, Applied Anthropology

**Chaffey College, Rancho Cucamonga, California** **June 2013**
Associate of Arts: Social Sciences

## Relevant Coursework

**Archaeology Field Class, Lake Arrowhead, California** **Spring 2015**
Conducted excavations in a small group overseen by Dr. Mark W. Allen.
Documented unit elevations and used basic excavations skills such as troweling and dry screening.

**Cultural Resources Management Class** **Winter 2015**
Studied the basic laws regarding the protection of historic properties.
Involved in a group effort to nominate the Santa Anita Racetrack to be on the National Register of Historic Properties.

**California Archaeology Class** **Winter 2015**
Presented research paper on human behavioral ecology during the Medieval Climatic Anomaly.
Studied prehistoric California culture ways to understand subsistence patterns and inter-tribal communications.

## Leadership

**San Bernardino County Library Page, Fontana, California** **June 2017- Present**
Lewis Library and Technology Center
**San Bernardino County Museum Volunteer** **February 2016- June 2016**

Upland Heritage P.O. Box 1828 Upland, CA 91785 US

(909) 981-0280

# Upland Heritage "Making a Difference Preserving Upland History Since 1989"

## Contact Us

Thank you for your inquiry! We will get back to you within 48 hours.

UPLAND HERITAGE

P.O. Box 1828Upland, CA 91785US

(909) 981-0280

Today Closed

Board Meetings are held the 3rd Thursday of every month, except in July, August and December, at 7 pm at the Cooper Museum in Downtown Upland. Please feel free to join us and join in on the fun!

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## Michael DeGiovine

**From:** Sonia Sifuentes
**Sent:** Tuesday, January 10, 2023 8:16 AM
**To:** Upland Heritage
**Cc:** Evelyn Hildebrand
**Subject:** RE: Contact Form: Contact Us
**Attachments:** Colonies_LnV(draft01).pdf

Good morning,

Please see the attached map for the project we reached out to you about, The Colonies Upland. Please let us know if you need any further information from us to help with this request. Thank you!

Sincerely,
Sonia

-----Original Message-----
From: support=1cee3593-9fbe-4b30-9155-7acaab021685.mail.conversations.godaddy.com@mail.conversations.godaddy.com <support=1cee3593-9fbe-4b30-9155-7acaab021685.mail.conversations.godaddy.com@mail.conversations.godaddy.com> On Behalf Of Upland Heritage
Sent: Monday, January 9, 2023 8:01 PM
To: Sonia Sifuentes <ssifuentes@ecorpconsulting.com>
Subject: Re: Contact Form: Contact Us

Hi, I didn't see a map attached. Can you send again. Thank you

# APPENDIX B

Sacred Lands File Coordination

# Sacred Lands File & Native American Contacts List Request

**Native American Heritage Commission**
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

*Information Below is Required for a Sacred Lands File Search*

**Project: _2023-006 Colonies  Partners Upland_____**

**County:** San Bernardino

**USGS Quadrangle Name:_Ontario CA (1978) unsectioned Cucamonga Land Grant, SBBM__**

**Township:__01S_____ Range:_07W_____ Section(s):_8_____**

**Company/Firm/Agency:__ECORP Consulting Inc._____**

**Street Address:_215 North 5th Street_____**

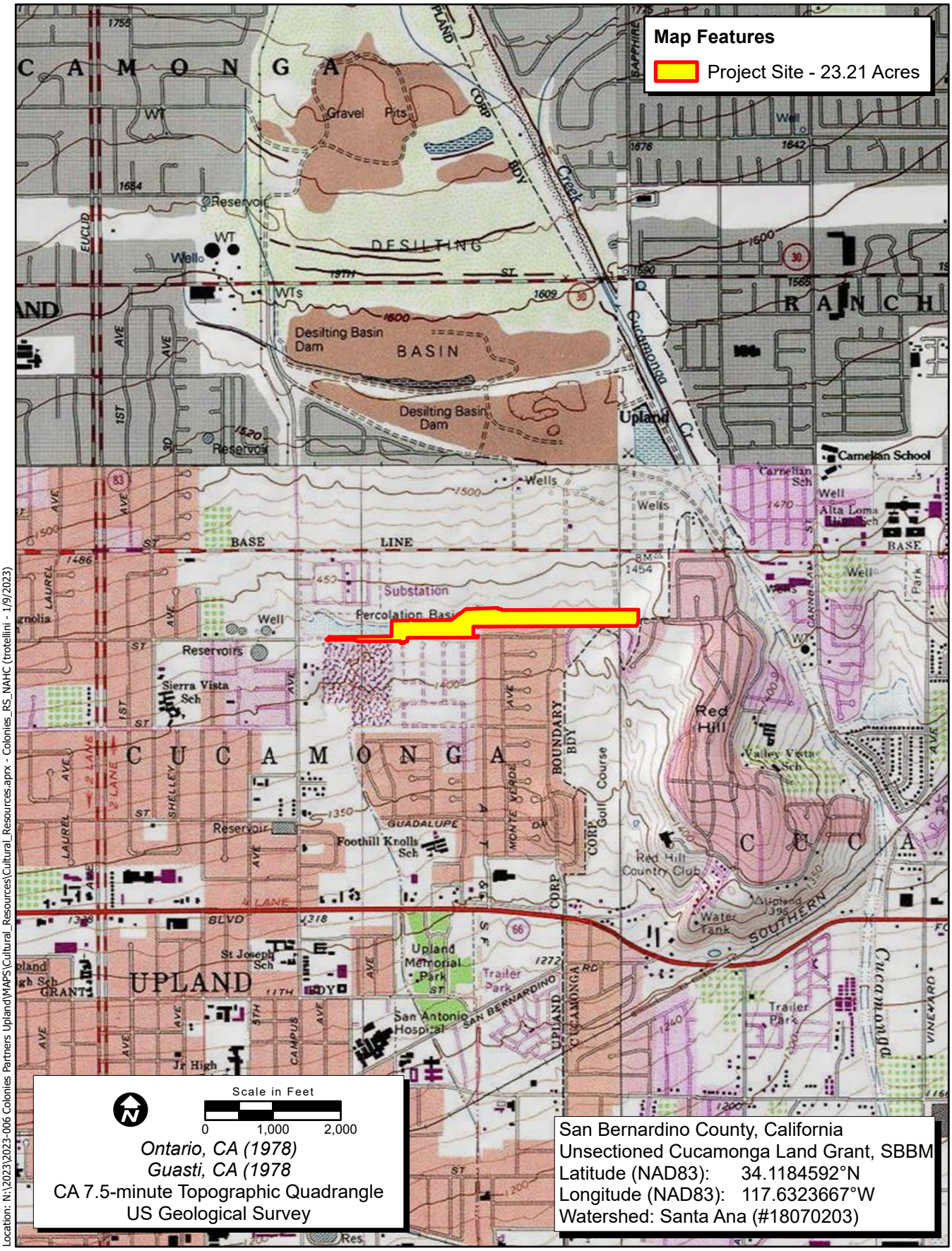
**City:_Redlands_____ Zip:_92374_____**

**Phone:_(909) 307-0046_____**

**Fax:_(909) 307-0056_____**

**Email:_ssifuentes@ecorpconsulting.com_____**

**Project Description: Proposed residential development in the City of Upland on 10 acres. Please refer to project number 2023-006 on all correspondence**




Location: N:\2023\2023-006 Colonies Partners Upland\MAPS\Cultural_Resources\Cultural_Resources.aprx - Colonies_RS_NAHC (trotellini - 1/9/2023)

Map Date: 1/9/2023

*Sources: ESRI, USGS*

**Records Search**

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2023-006 Colonies Partners Upland

# NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
**Laura Miranda**
*Luiseño*

VICE CHAIRPERSON
**Reginald Pagaling**
*Chumash*

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COMMISSIONER
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*Ohlone-Costanoan*

COMMISSIONER
**Buffy McQuillen**
*Yokayo Pomo, Yuki, Nomlaki*

COMMISSIONER
**Wayne Nelson**
*Luiseño*

COMMISSIONER
**Stanley Rodriguez**
*Kumeyaay*

COMMISSIONER
**[Vacant]**

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
**Raymond C. Hitchcock**
*Miwok/Nisenan*

**NAHC HEADQUARTERS**
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

January 30, 2023

Evelyn Hildebrand
ECORP Consulting Inc

Via Email to: ehildebrand@ecorpconsulting.com

**Re: 2023-006 Colonies Partners Upland Project, San Bernardino County**

Dear Ms. Hildebrand:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
*Cultural Resources Analyst*

Attachment

**Native American Heritage Commission**
**Native American Contact List**
**San Bernardino County**
**1/30/2023**

***Agua Caliente Band of Cahuilla Indians***
Reid Milanovich, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919
laviles@aguacaliente.net

***Agua Caliente Band of Cahuilla Indians***
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

***Augustine Band of Cahuilla Mission Indians***
Amanda Vance, Chairperson
84-001 Avenue 54 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

***Cabazon Band of Mission Indians***
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

***Cahuilla Band of Indians***
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

***Gabrieleno Band of Mission Indians - Kizh Nation***
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

***Gabrieleno/Tongva San Gabriel Band of Mission Indians***
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

***Gabrielino /Tongva Nation***
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

***Gabrielino Tongva Indians of California Tribal Council***
Christina Conley, Tribal Consultant and Administrator
P.O. Box 941078 — Gabrielino
Simi Valley, CA, 93094
Phone: (626) 407 - 8761
christina.marsden@alumni.usc.edu

***Gabrielino Tongva Indians of California Tribal Council***
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

***Gabrielino-Tongva Tribe***
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

***Juaneno Band of Mission Indians Acjachemen Nation - Belardes***
Matias Belardes, Chairperson
32161 Avenida Los Amigos — Juaneno
San Juan Capisttrano, CA, 92675
Phone: (949) 293 - 8522
kaamalam@gmail.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 2023-006 Colonies Partners Upland Project, San Bernardino County.

**Native American Heritage Commission**
**Native American Contact List**
**San Bernardino County**
**1/30/2023**

***Juaneno Band of Mission Indians Acjachemen Nation - Belardes***
Joyce Perry, Tribal Manager
4955 Paseo Segovia — Juaneno
Irvine, CA, 92603
Phone: (949) 293 - 8522
kaamalam@gmail.com

***Juaneno Band of Mission Indians Acjachemen Nation 84A***
Heidi Lucero, Chairperson
31411-A La Matanza Street — Juaneno
San Juan Capistrano, CA, 92675
Phone: (562) 879 - 2884
hllucero105@gmail.com

***Los Coyotes Band of Cahuilla and Cupeño Indians***
Ray Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712

***Morongo Band of Mission Indians***
Ann Brierty, THPO
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 755 - 5259
Fax: (951) 572-6004
abrierty@morongo-nsn.gov

***Morongo Band of Mission Indians***
Robert Martin, Chairperson
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 755 - 5110
Fax: (951) 755-5177
abrierty@morongo-nsn.gov

***Pala Band of Mission Indians***
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

***Pechanga Band of Indians***
Paul Macarro, Cultural Resources Coordinator
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6306
Fax: (951) 506-9491
pmacarro@pechanga-nsn.gov

***Pechanga Band of Indians***
Mark Macarro, Chairperson
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6000
Fax: (951) 695-1778
epreston@pechanga-nsn.gov

***Quechan Tribe of the Fort Yuma Reservation***
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com

***Quechan Tribe of the Fort Yuma Reservation***
Jill McCormick, Historic Preservation Officer
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
Phone: (760) 572 - 2423
historicpreservation@quechantribe.com

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 2023-006 Colonies Partners Upland Project, San Bernardino County.

**Native American Heritage Commission**
**Native American Contact List**
**San Bernardino County**
**1/30/2023**

***Ramona Band of Cahuilla***
Joseph Hamilton, Chairperson
P.O. Box 391670 Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramona-nsn.gov

***Ramona Band of Cahuilla***
John Gomez, Environmental Coordinator
P. O. Box 391670 Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramona-nsn.gov

***Rincon Band of Luiseno Indians***
Bo Mazzetti, Chairperson
One Government Center Lane Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
bomazzetti@aol.com

***Rincon Band of Luiseno Indians***
Cheryl Madrigal, Tribal Historic Preservation Officer
One Government Center Lane Luiseno
Valley Center, CA, 92082
Phone: (760) 297 - 2635
crd@rincon-nsn.gov

***San Manuel Band of Mission Indians***
Jessica Mauck, Director of Cultural Resources
26569 Community Center Drive Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Jessica.Mauck@sanmanuel-nsn.gov

***Santa Rosa Band of Cahuilla Indians***
Lovina Redner, Tribal Chair
P.O. Box 391820 Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

***Serrano Nation of Mission Indians***
Wayne Walker, Co-Chairperson
P. O. Box 343 Serrano
Patton, CA, 92369
Phone: (253) 370 - 0167
serranonation1@gmail.com

***Serrano Nation of Mission Indians***
Mark Cochrane, Co-Chairperson
P. O. Box 343 Serrano
Patton, CA, 92369
Phone: (909) 528 - 9032
serranonation1@gmail.com

***Soboba Band of Luiseno Indians***
Isaiah Vivanco, Chairperson
P. O. Box 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
Phone: (951) 654 - 5544
Fax: (951) 654-4198
ivivanco@soboba-nsn.gov

***Soboba Band of Luiseno Indians***
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

***Torres-Martinez Desert Cahuilla Indians***
Cultural Committee,
P.O. Box 1160 Cahuilla
Thermal, CA, 92274
Phone: (760) 397 - 0300
Fax: (760) 397-8146
Cultural-Committee@torresmartinez-nsn.gov

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 2023-006 Colonies Partners Upland Project, San Bernardino County.

# APPENDIX C

Project Area Photographs

# PHOTOLOG

Project Name:Upland Colonies

Project Number:2023-006

Project Number:

| Camera | Photo No. | Description | Facing | Date | Initials |
|---|---|---|---|---|---|
| Samsung | 082115 | Project addition from southwest corner | East | 2/14/23 | JEA |
| | 082136 | Project south access road | East | 2/14/23 | JEA |
| | 082215 | Ground conditions south boundary | Detail | 2/14/23 | JEA |
| | 082804 | Ground conditions south boundary | Detail | 2/14/23 | JEA |
| | 083514 | Project east boundary | North | 2/14/23 | JEA |
| | 083518 | Project from southeast corner | Northwest | 2/14/23 | JEA |
| | 085205 | Modern drainage center project | North | 2/14/23 | JEA |
| | 085408 | Ground conditions north boundary | West | 2/14/23 | JEA |
| | 085946 | Modern drainage northeast corner | Northeast | 2/14/23 | JEA |
| | 092418 | Project from northeast corner | Southwest | 2/14/23 | JEA |
| | 092447 | Northeast drainage | Northeast | 2/14/23 | JEA |
| | 092454 | Project north boundary | West | 2/14/23 | JEA |
| | 093942 | Field check area southwest corner | Southeast | 2/14/23 | JEA |
| | 094028 | Field check area center basin | East | 2/14/23 | JEA |
| | 094032 | Field check area from northwest corner | Northeast | 2/14/23 | JEA |
| | 094115 | Field check area, west portion on 15$^{th}$ street | Southwest | 2/14/23 | JEA |
| | | | | | |
| | | | | | |


20230214_082115


20230214_082136


20230214_082215


20230214_082804


20230214_083514


20230214_083518


20230214_085205


20230214_085408


20230214_085946


20230214_092418


20230214_092447


20230214_092454


20230214_093942


20230214_094028


20230214_094032


20230214_094115































