INITIAL STUDY

VILLA SERENA SPECIFIC PLAN PROJECT

CITY OF UPLAND

SAN BERNARDINO COUNTY, CALIFORNIA

LSA

October 2019

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Prepared for:

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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:

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After the 20-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

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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	
		Existing	Proposed	Existing	Proposed
Project Site	Flood Control/Recharge Basin	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:

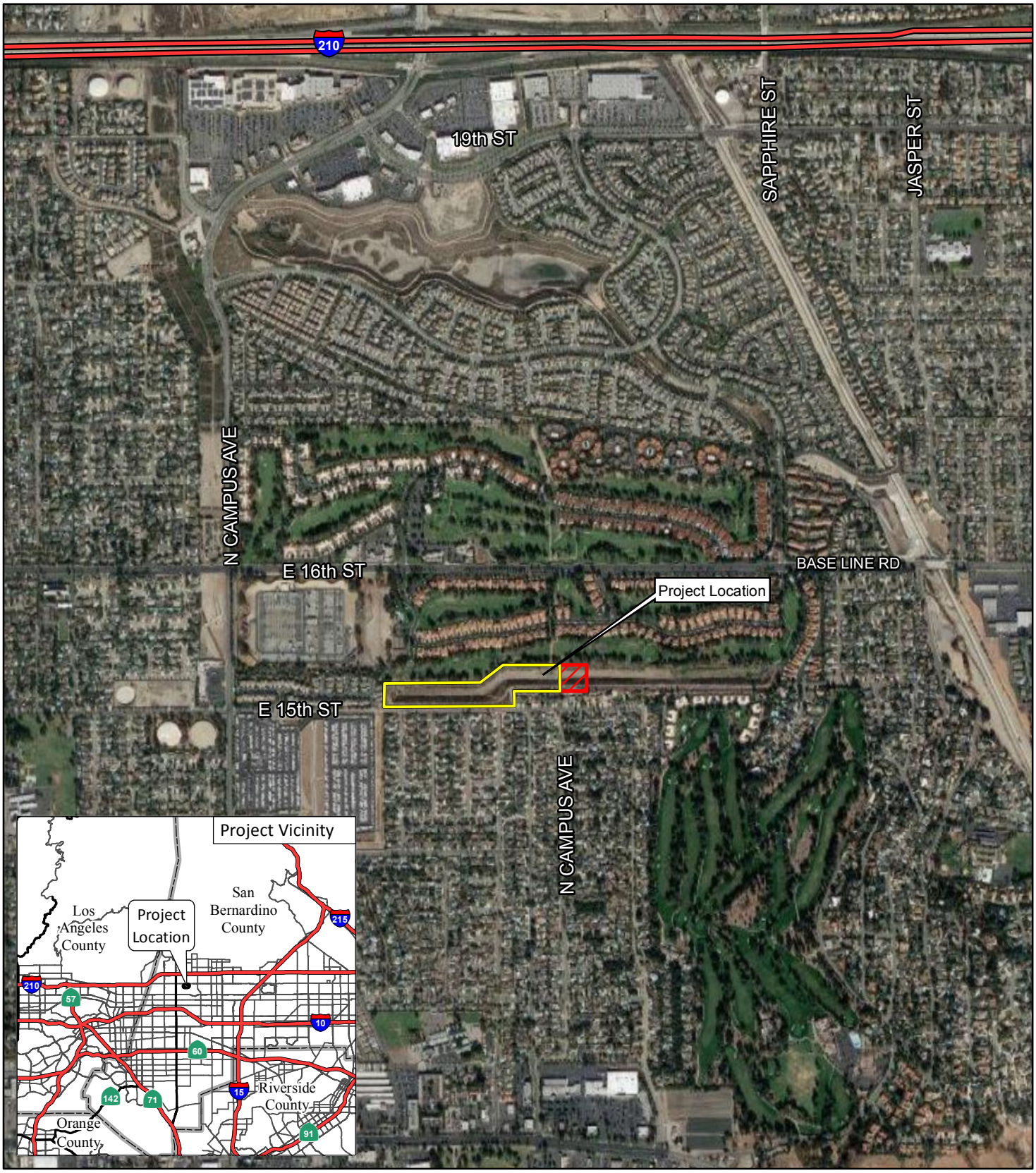
- An existing local inlet pipe located approximately 300 feet east of the Site eastern boundary is anticipated to be a 36" reinforced concrete pipe (RCP) routed through the Site to the new inlet.
- An existing concrete trapezoidal channel located approximately 60' west of the eastern edge of the Project 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)

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

FIGURE 1

Villa Serena Specific Plan

Regional and Project Location

LSA

LEGEND

Project Site

Area of Off-Site Improvements

N

0 175 350
FEET

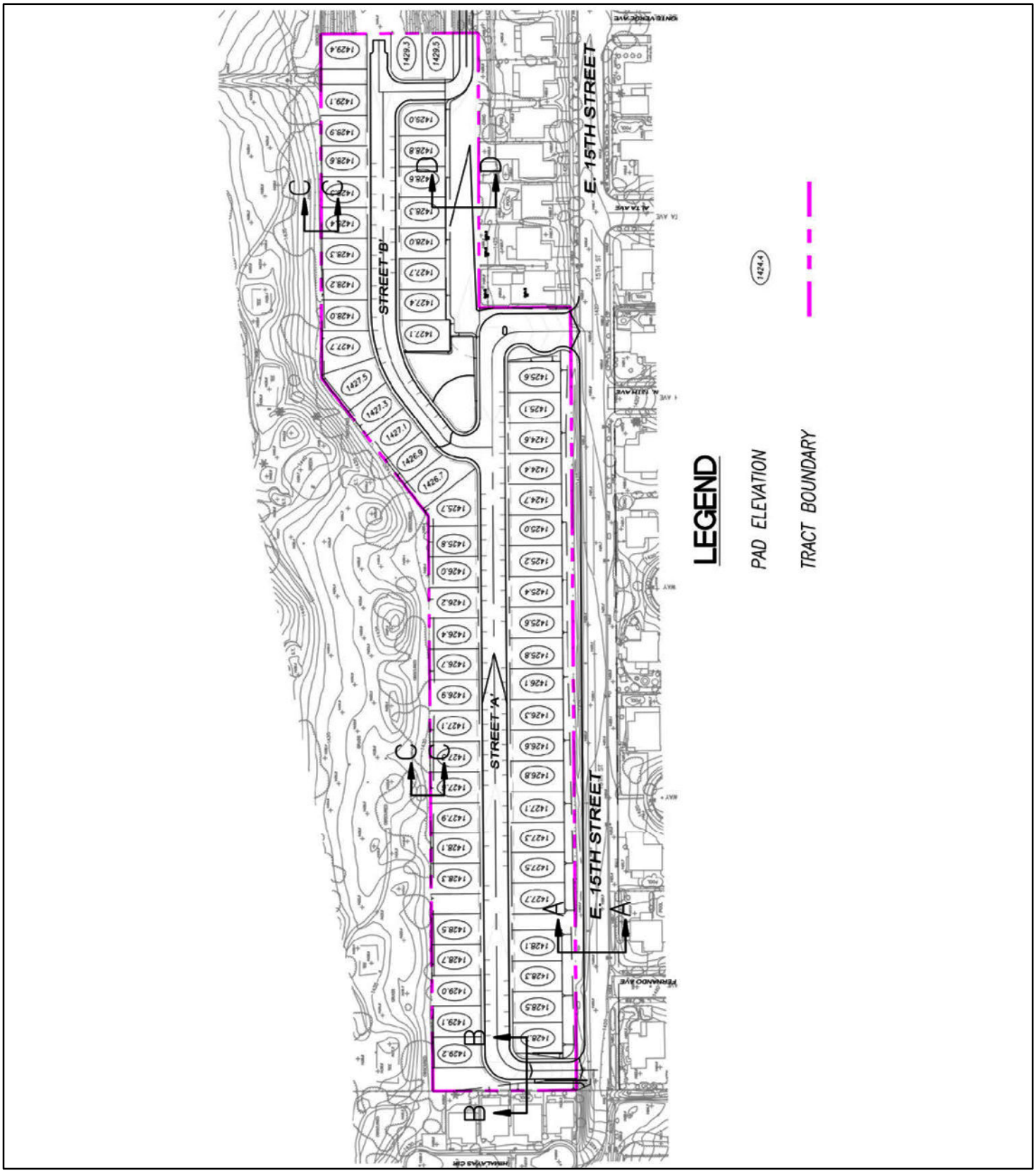
SOURCE: RCA (2018); Google (2018)

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

FIGURE 2

Villa Serena Specific Plan

Project Setting



LSA

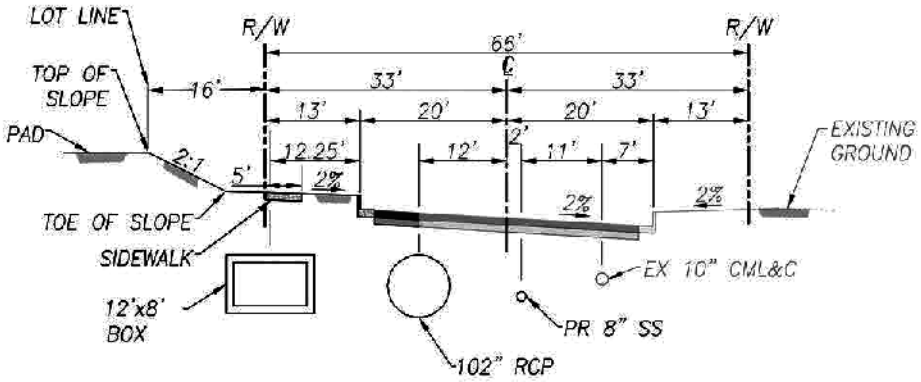
FIGURE 3a

Villa Serena Specific Plan

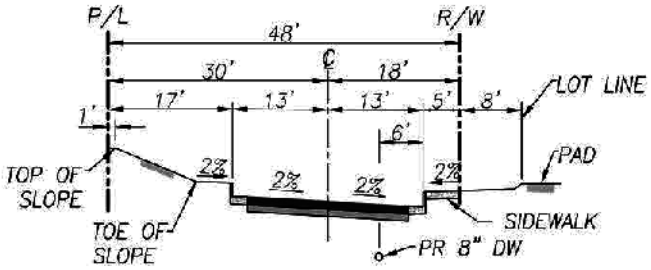
Conceptual Grading Plan

SOURCE: Proactive Engineering Consultants (2018)

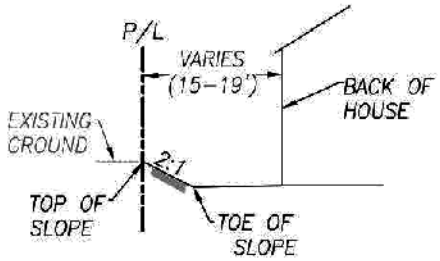
I:\FTR1801\GIS\MXD\IS\ConceptualGradingPlan.mxd (10/17/2018)



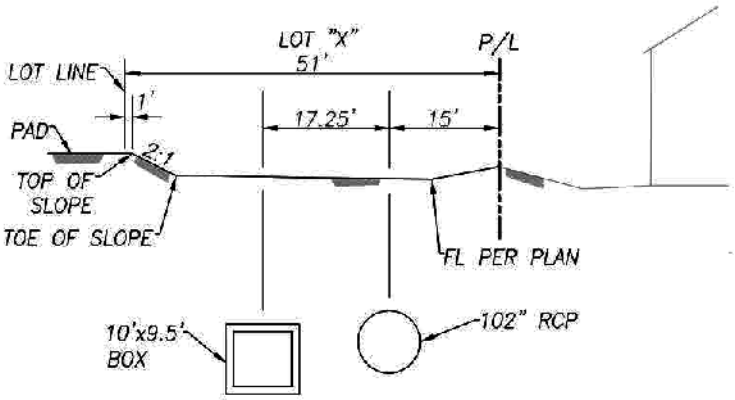
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

LSA

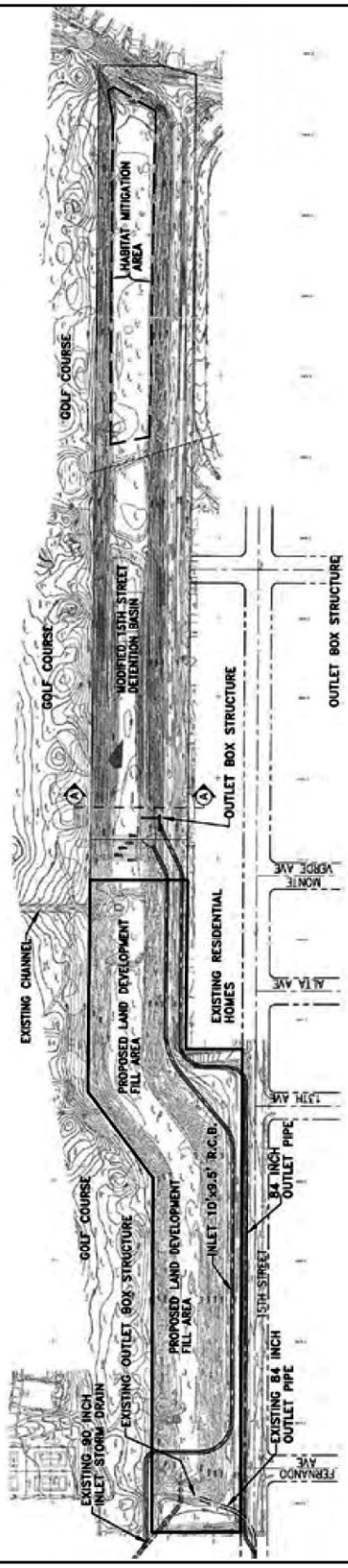
FIGURE 3b

Villa Serena Specific Plan

Conceptual Grading Plan - Cross Sections

SOURCE: Proactive Engineering Consultants (2018)

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



LSA

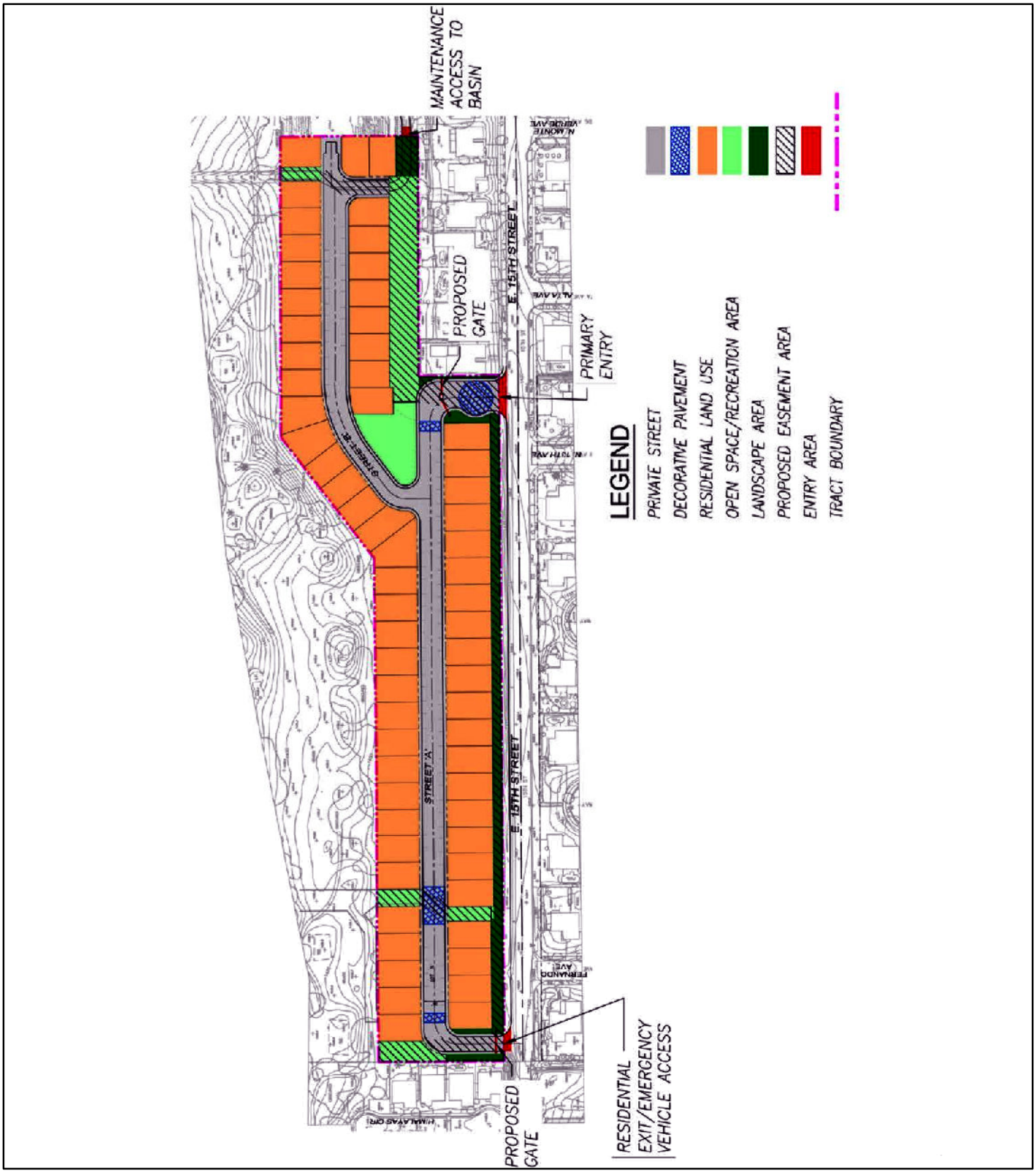
FIGURE 3c

Villa Serena Specific Plan

Conceptual Basin Modification Plan

SOURCE: Proactive Engineering Consultants (2019)

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



LSA

FIGURE 4a

Villa Serena Specific Plan

Land Use Plan

SOURCE: Proactive Engineering Consultants (2018)

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

LSA

FIGURE 4b

Villa Serena Specific Plan

Conceptual Site Plan

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

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

PLAN 1

PLAN 2

PLAN 3

LSA

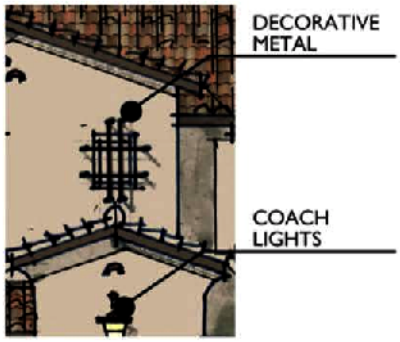
FIGURE 5a

Villa Serena Specific Plan

Architectural Renderings - Spanish Style

SOURCE: Bassenian/Lagoni (2018)

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



LSA

FIGURE 5b

Villa Serena Specific Plan

Spanish Style - Details

SOURCE: Bassenian/Lagoni (2018)

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

LSA

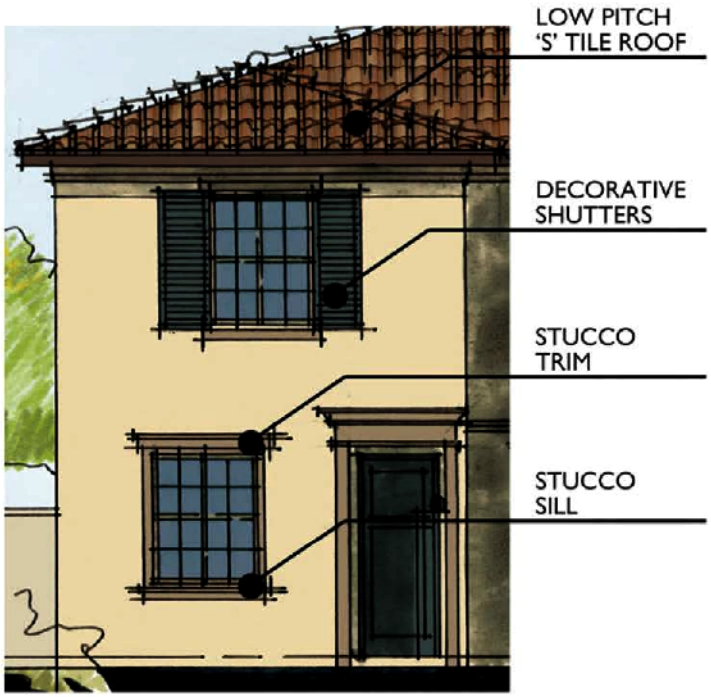
FIGURE 6a

Villa Serena Specific Plan

Architectural Renderings - Italianate Style

SOURCE: Bassenian/Lagoni (2018)

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



LSA

FIGURE 6b

Villa Serena Specific Plan

Italianate Style - Details

SOURCE: Bassenian/Lagoni (2018)

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

LSA

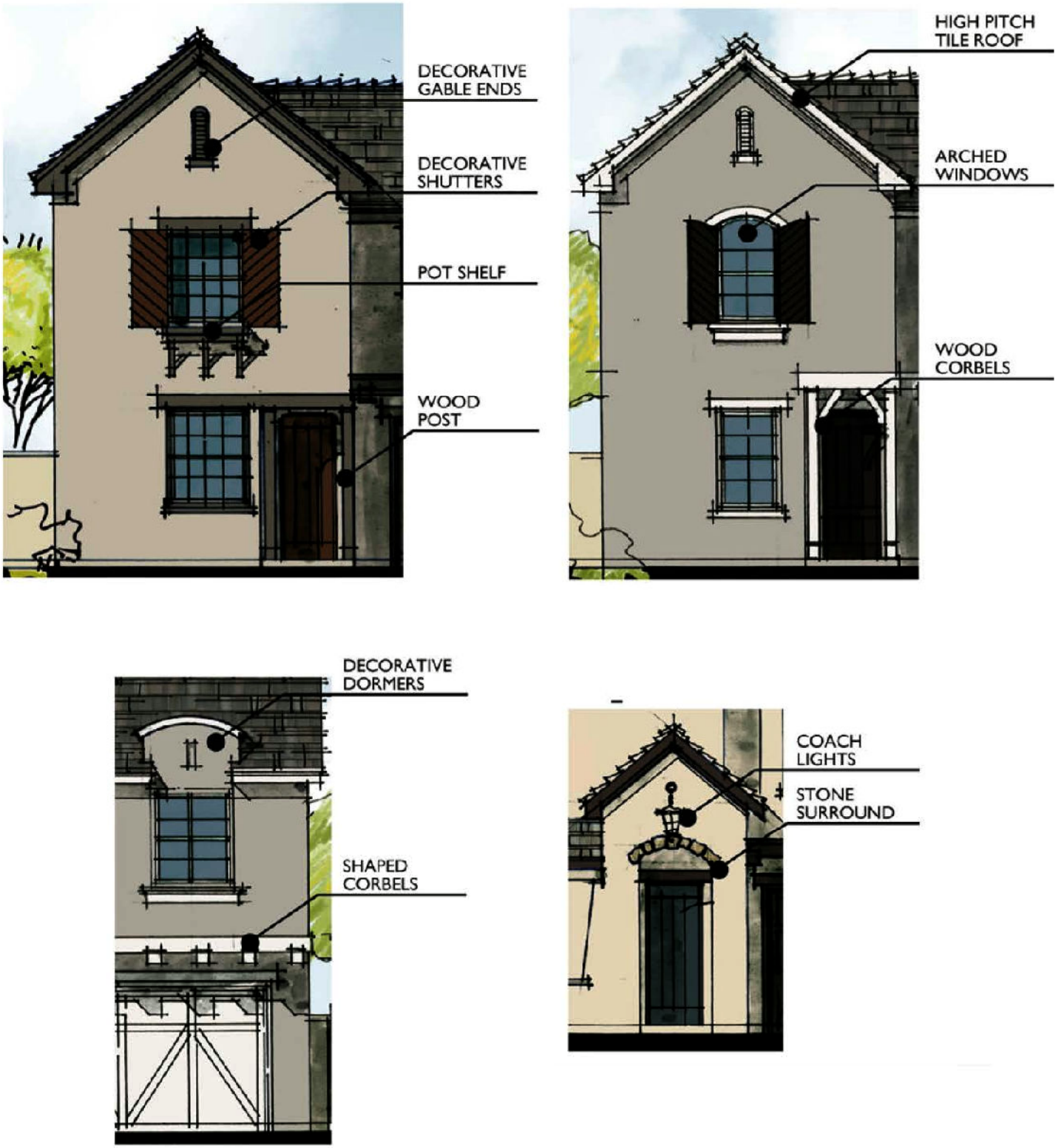
FIGURE 7a

Villa Serena Specific Plan

Architectural Renderings - French Country Style

SOURCE: Bassenian/Lagoni (2018)

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



LSA

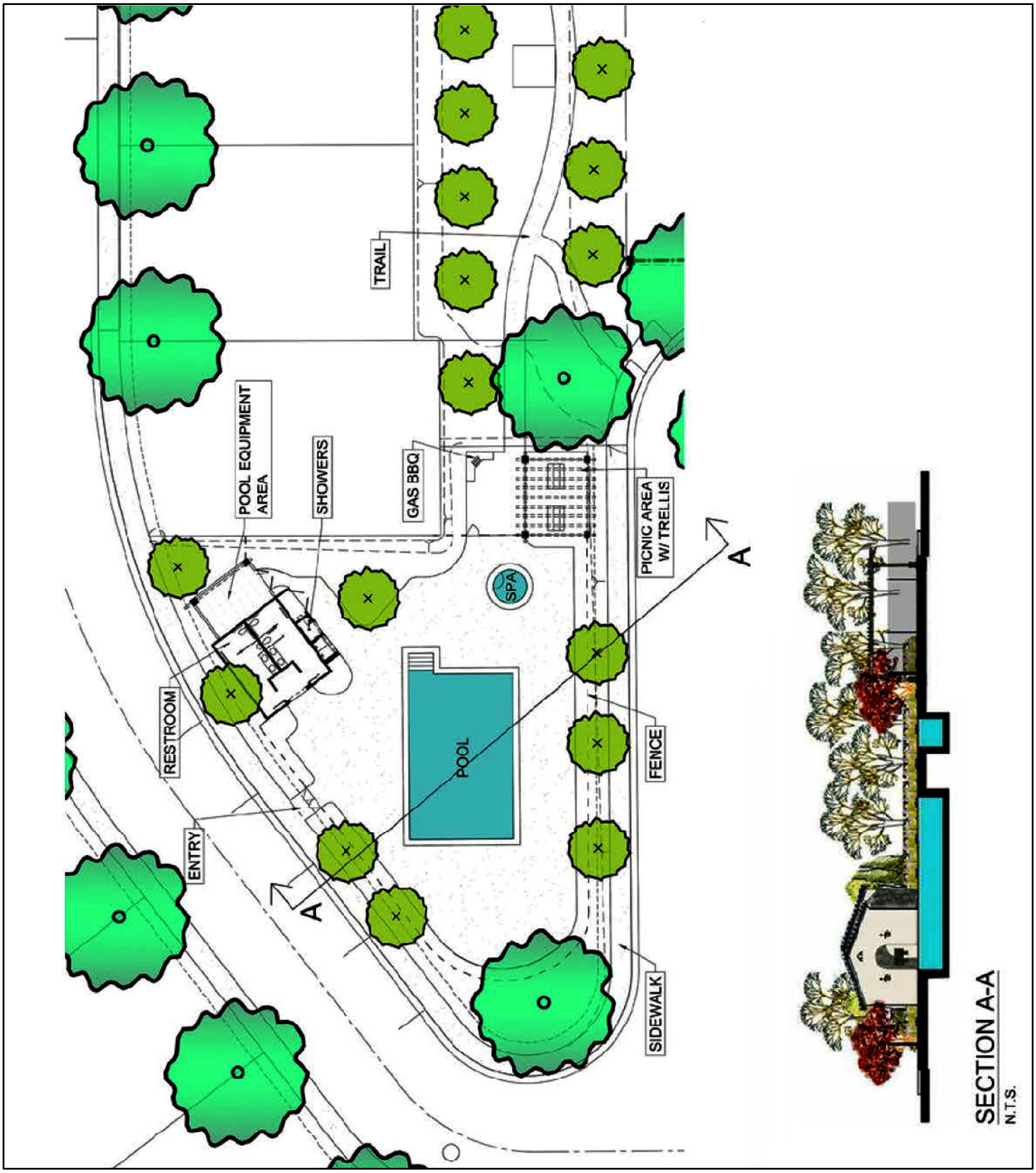
FIGURE 7b

Villa Serena Specific Plan

French Country Style - Details

SOURCE: Bassenian/Lagoni (2018)

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



LSA

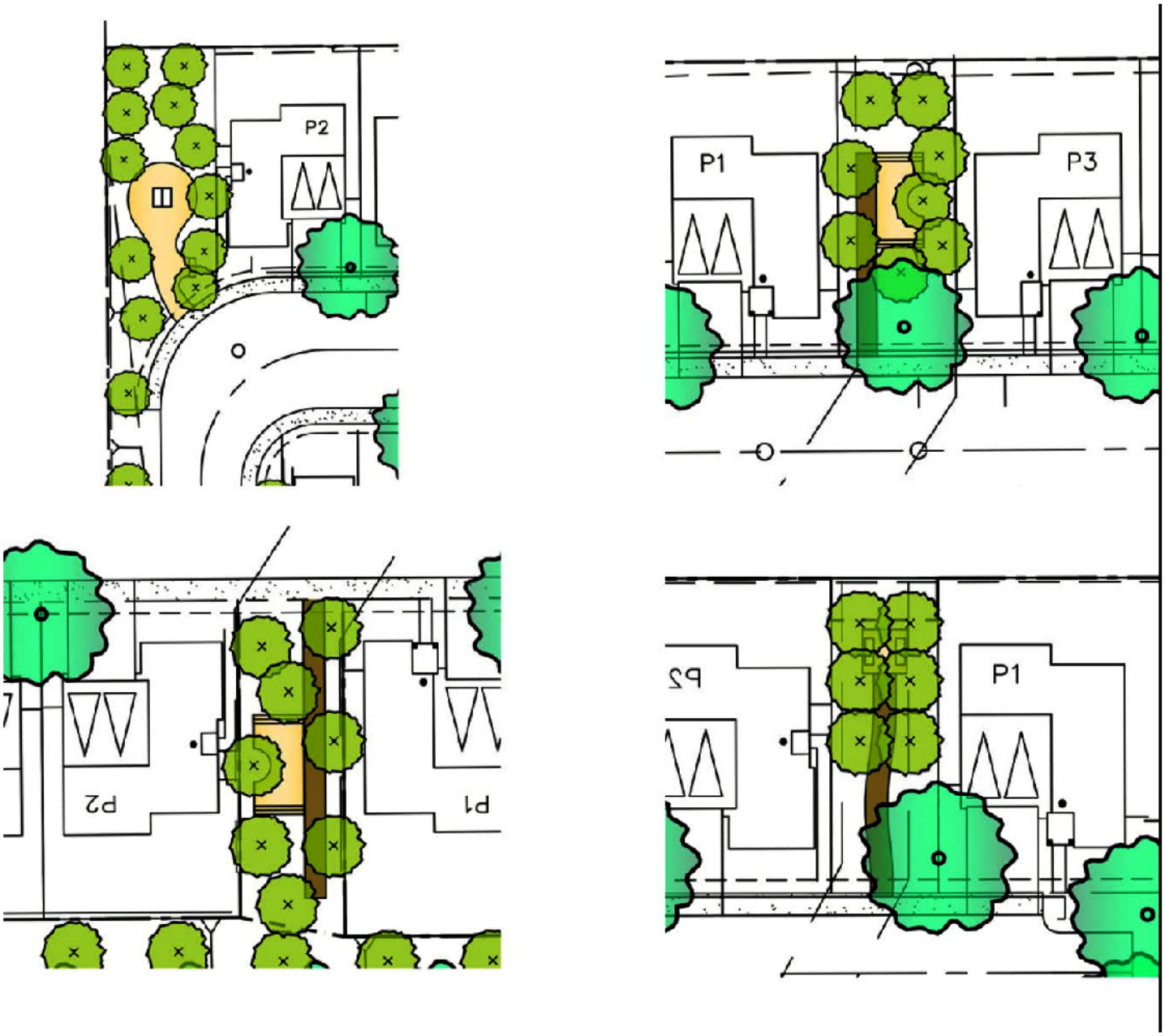
FIGURE 8a

Villa Serena Specific Plan

Central Open Space Plan

SOURCE: Bassenian/Lagoni (2018)

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



LSA

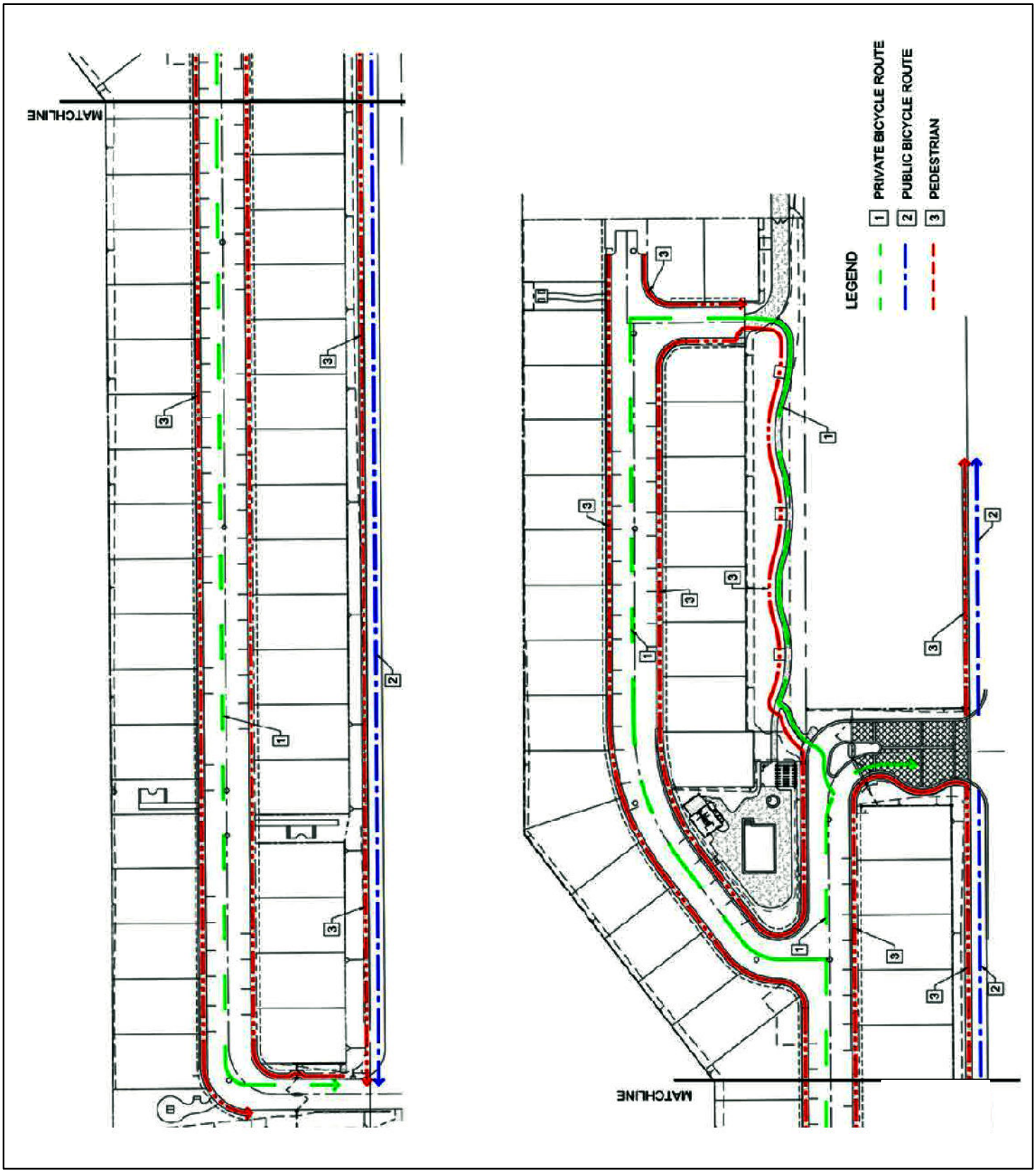
FIGURE 8b

Villa Serena Specific Plan

Pocket Park Plans

SOURCE: Bassenian/Lagoni (2018)

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



LSA

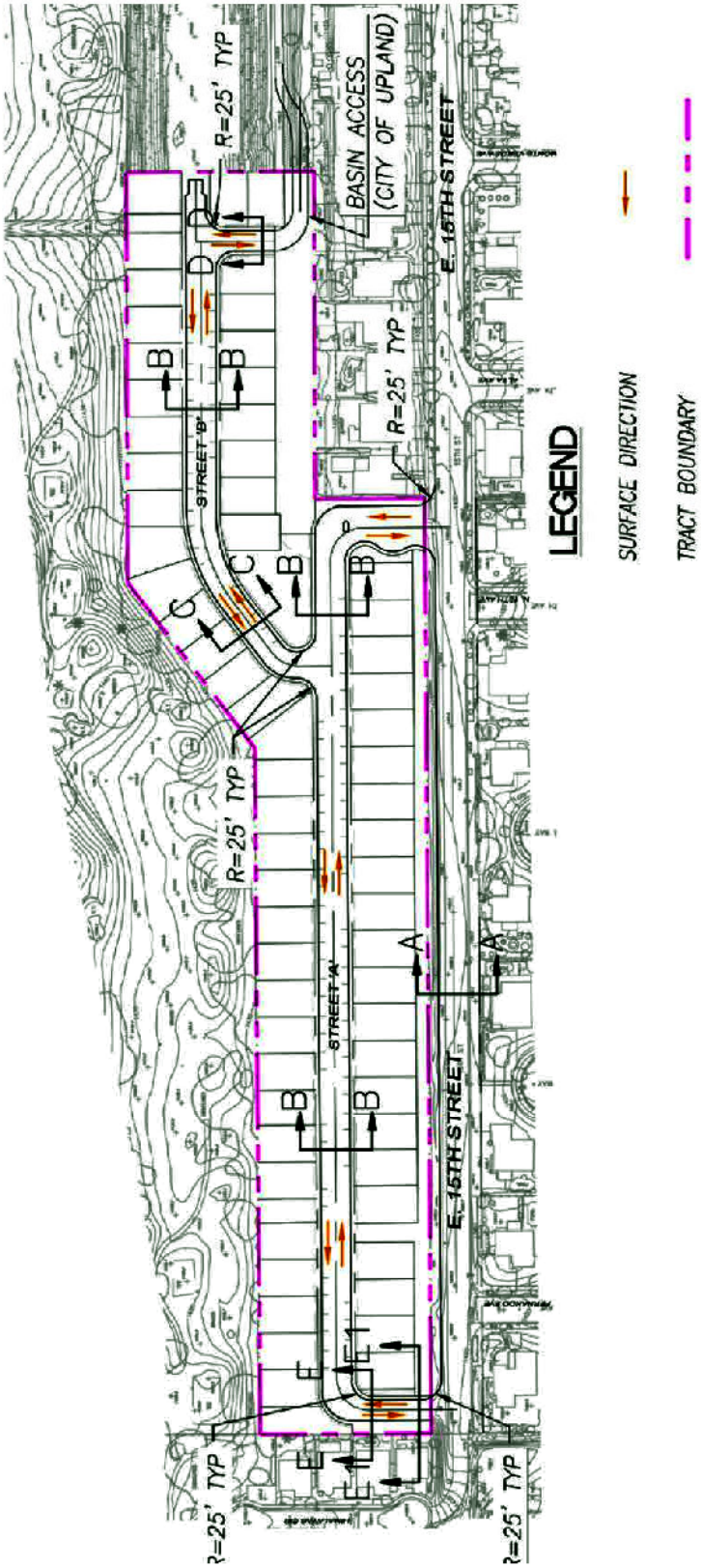
FIGURE 9

Villa Serena Specific Plan

Connectivity Plan

SOURCE: Bassenian/Lagoni (2018)

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



LSA

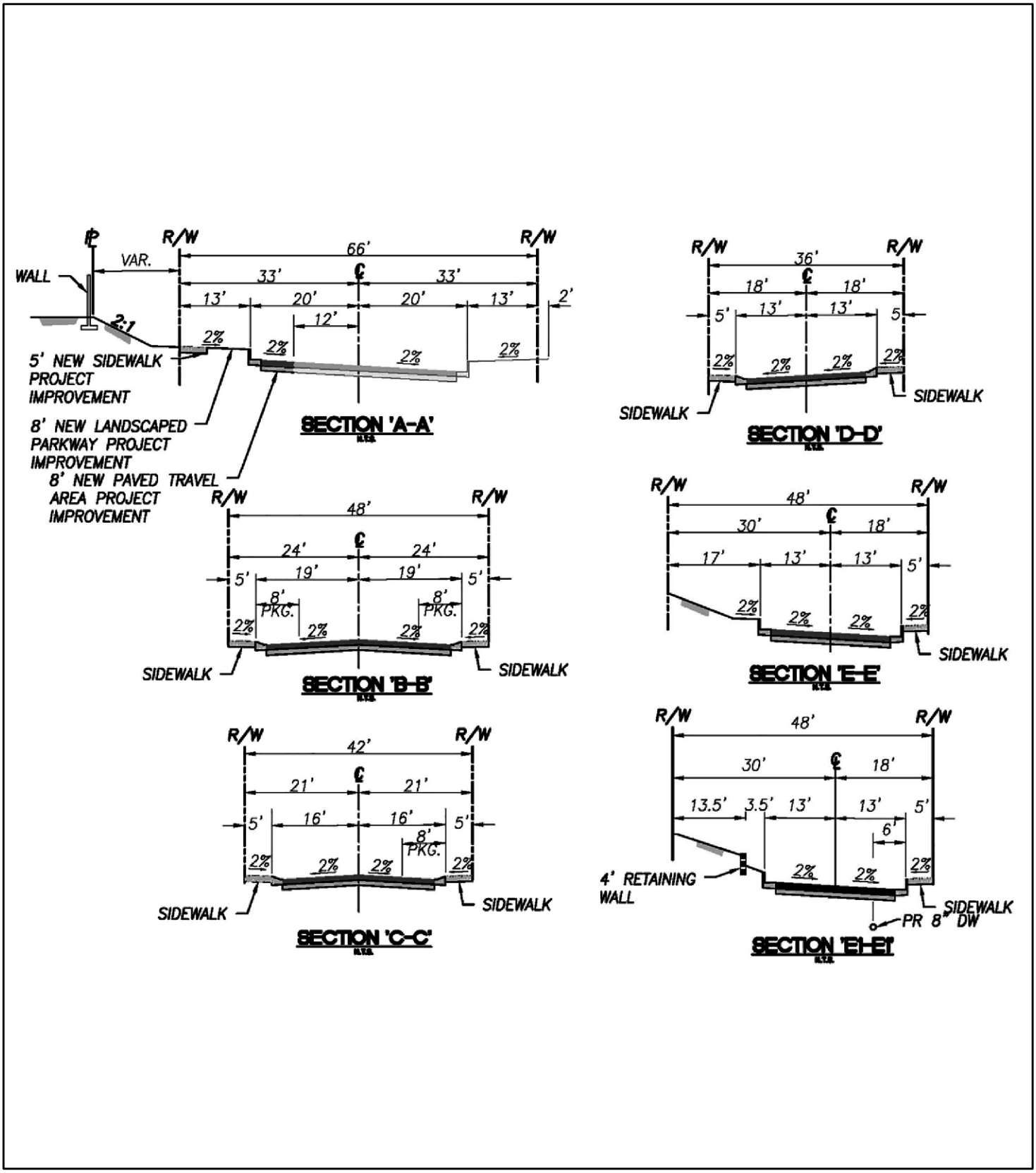
FIGURE 10a

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

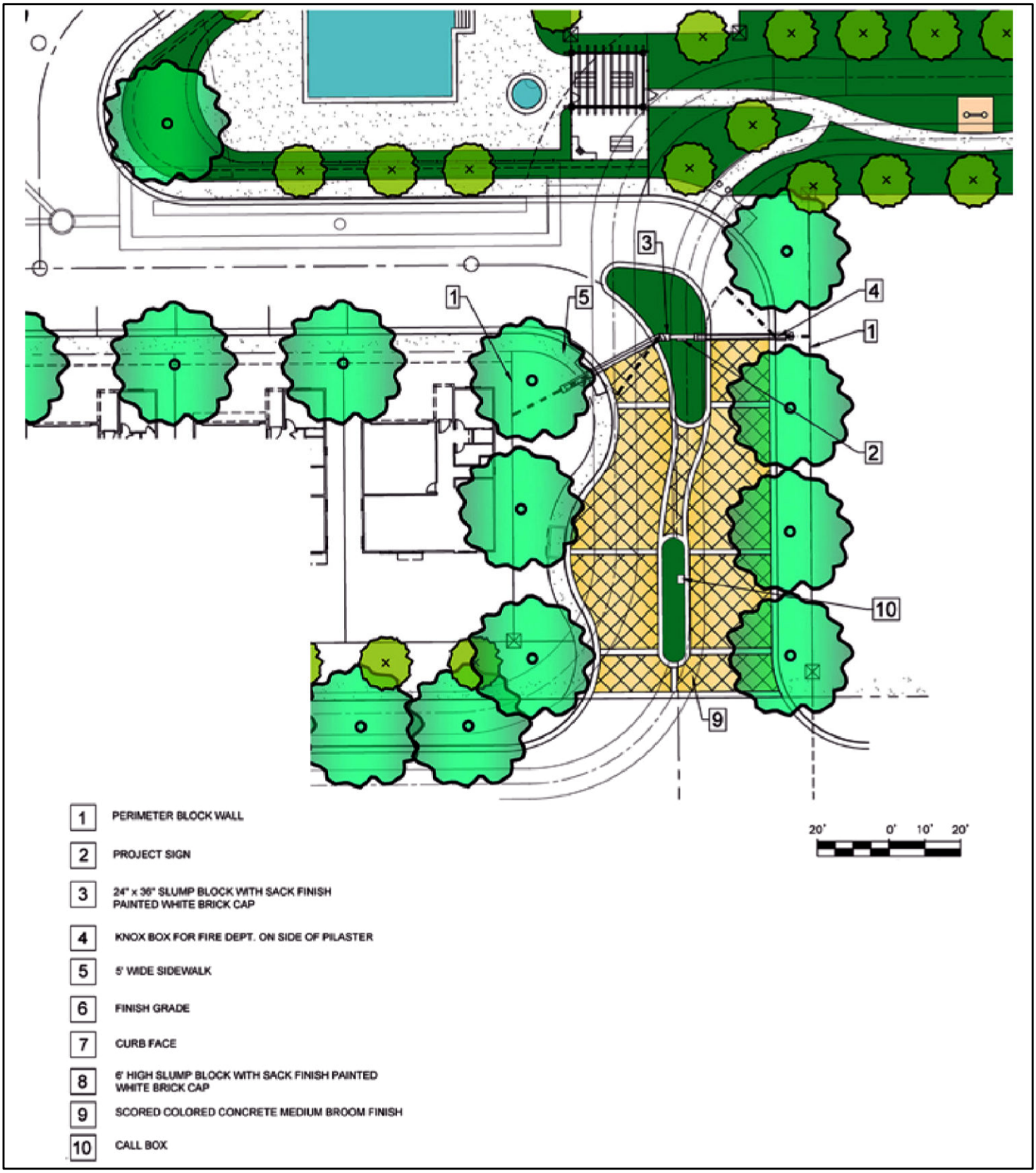
FIGURE 10b

Villa Serena Specific Plan

Street Cross Sections

SOURCE: Proactive Engineering Consultants (2019)

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



LSA

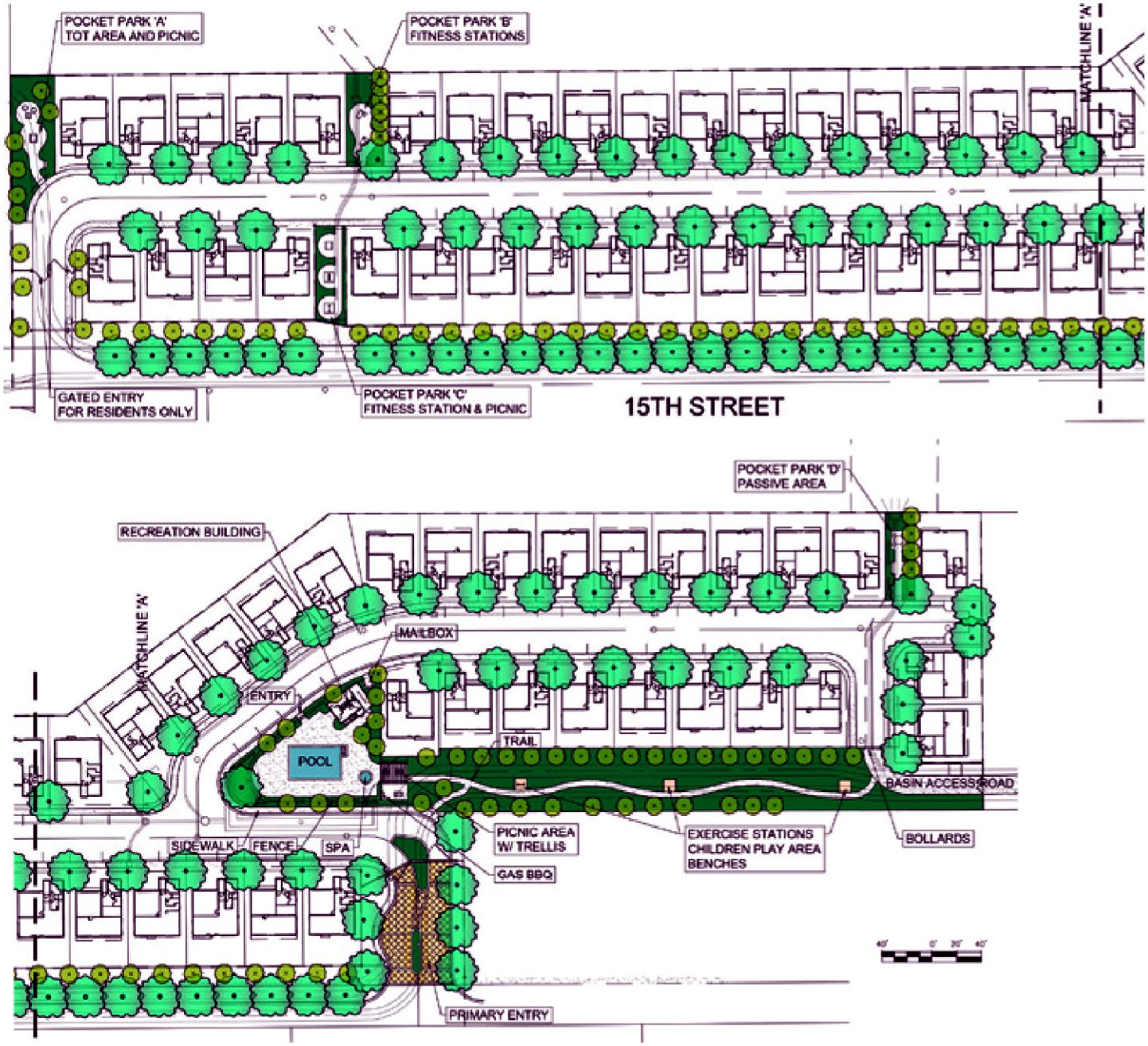
FIGURE 11a

Villa Serena Specific Plan

Primary Community Entry

SOURCE: Bassenian/Lagoni (2019)

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



LSA

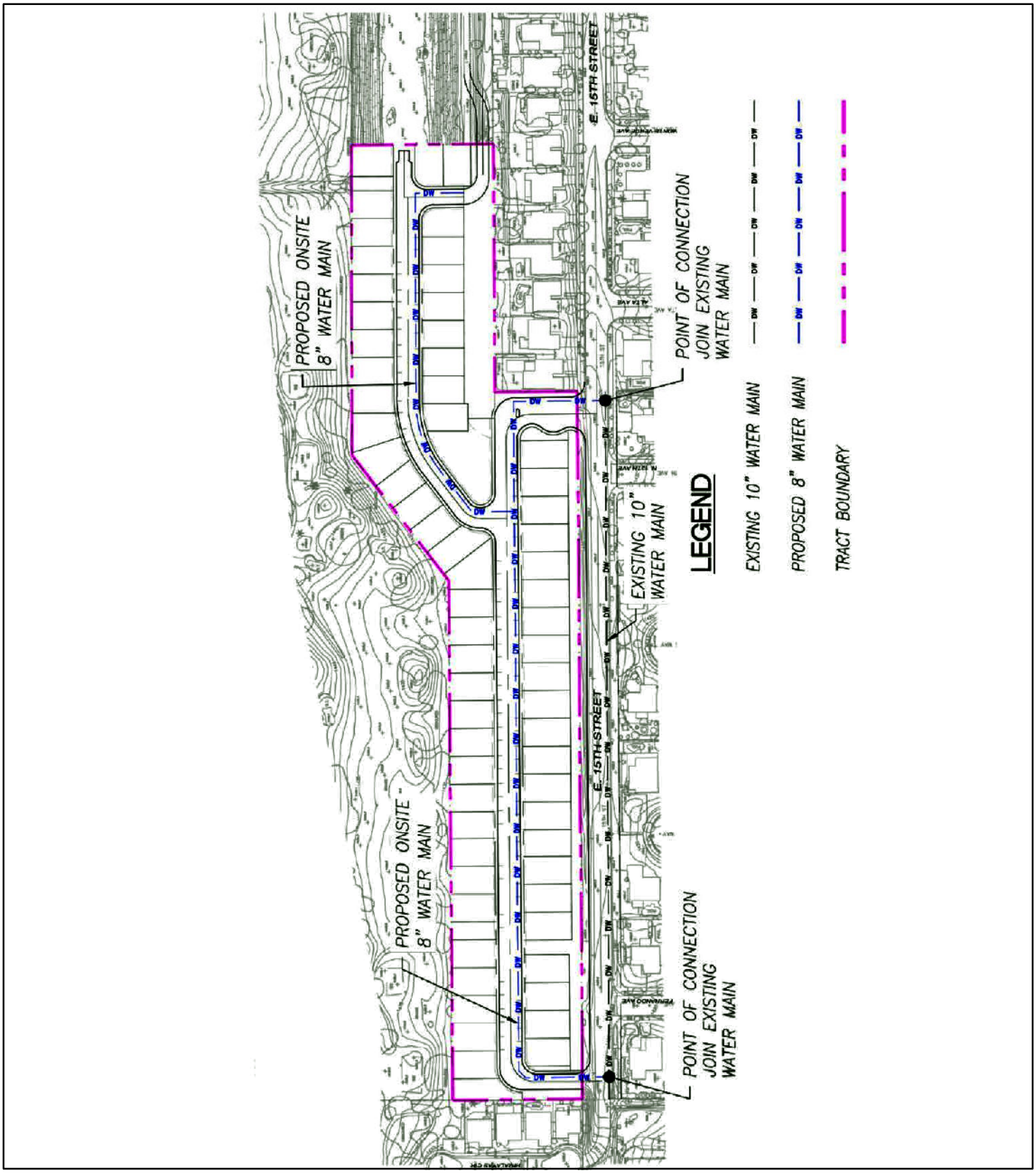
FIGURE 11b

Villa Serena Specific Plan

Conceptual Landscape Plan

SOURCE: Bassenian/Lagoni (2019)

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



LSA

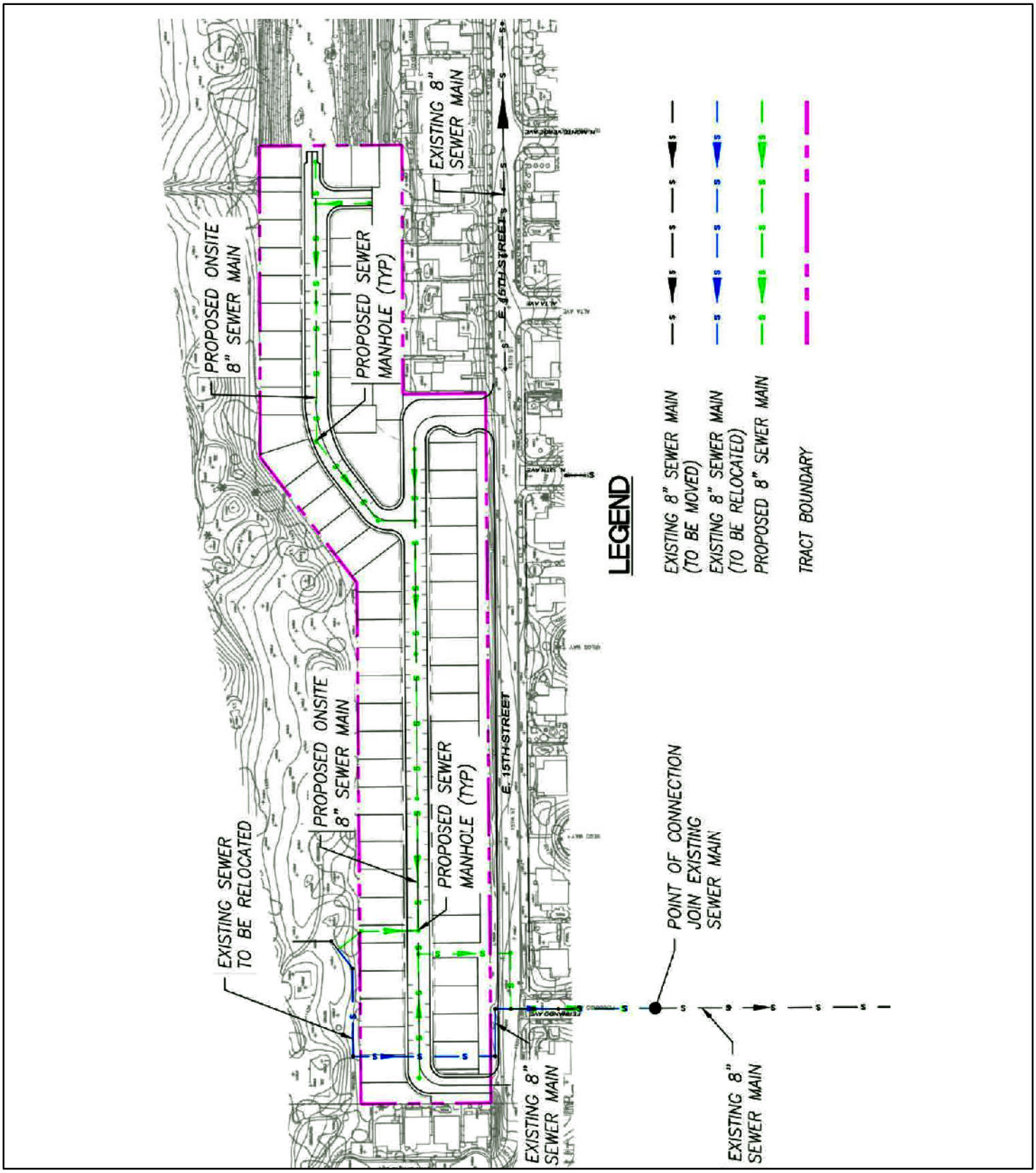
FIGURE 12

Villa Serena Specific Plan

Water Master Plan

SOURCE: Proactive Engineering Consultants (2018)

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



LSA

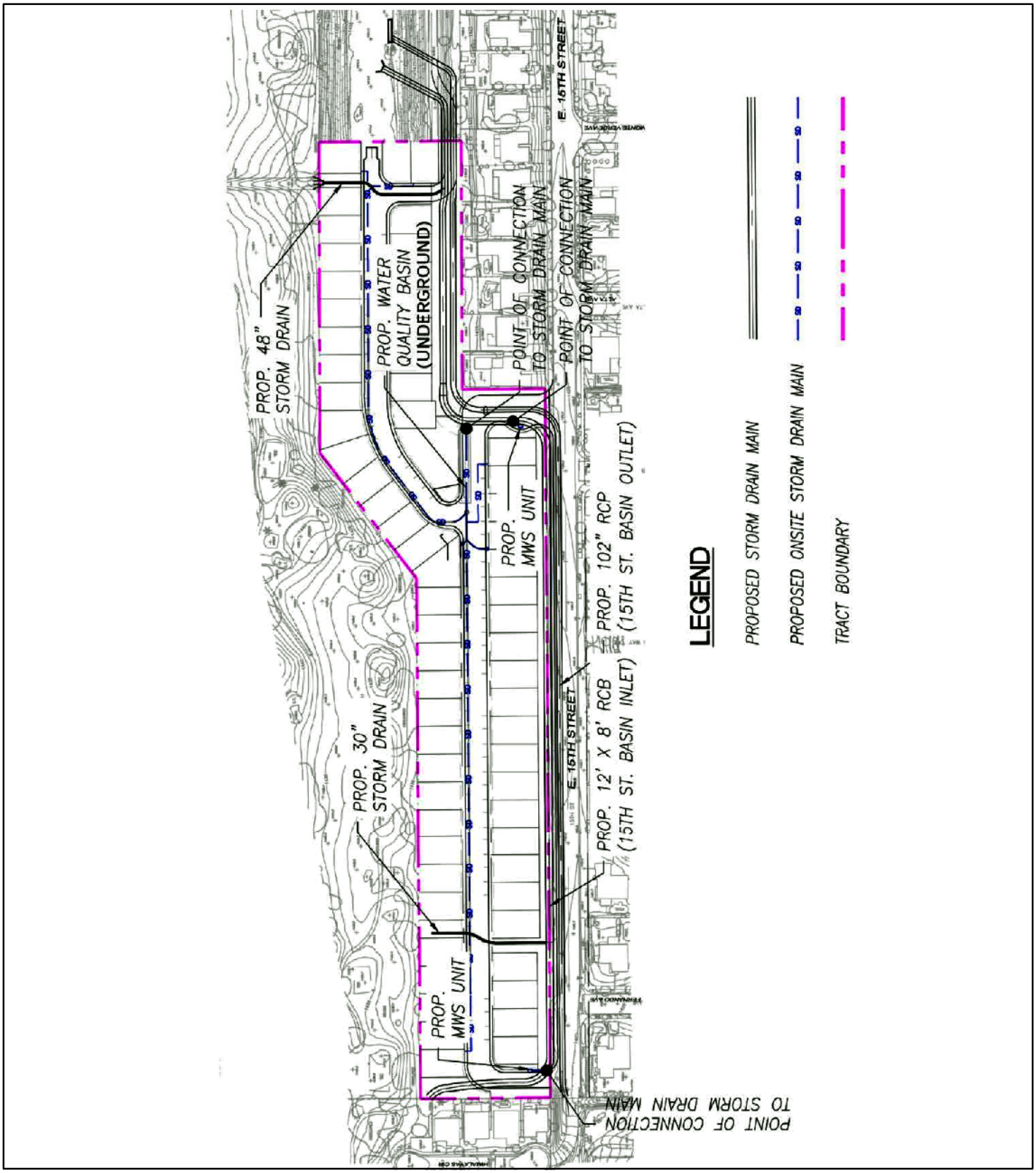
FIGURE 13

Villa Serena Specific Plan

Sewer Master Plan

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 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] 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. 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. 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. 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 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 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 auduboni*), 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.** 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 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.

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 Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving: (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. (ii) Strong seismic ground shaking? (iii) Seismic-related ground failure, including liquefaction? (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

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.

(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
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.				
(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. **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. 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

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

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

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

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

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

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

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

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.

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.

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 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 (15th 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 • Preserve natural vegetation • Stabilize drainage ways	• Install perimeter controls • Install sediment trapping devices • Inlet protection	• Stabilize exposed soils • Protect steep slopes • Complete construction in phases	• Create waste collection area • Put lids on containers • 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

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 15th 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 15th Street Basin.

The existing RCP storm drain inlet is located approximately 200 feet northwest of the Fernando Avenue and 15th 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 15th Street Basin outlet located east of the Project Site, as detailed in the Project-specific Drainage Plan (Appendix G1) and described below.

The relocated 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 round catch basin (RCB) which will discharge into the

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

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

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] 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. 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] 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] 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. 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

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. 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. 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

particularly near public transit and within the historic downtown.	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. 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.
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.	
Policy LU-4.3: Jobs Housing Balance. Encourage a balance between jobs, workforce skills, and housing supply.	
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.	
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. 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.	**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. 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. The Project's development of the flood control detention basin with SFR-M
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.	

	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

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 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

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:

- 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

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

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 15th 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 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.

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 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

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

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

(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
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
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.				
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

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
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

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 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. 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. 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.**				

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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

APPENDIX B:

BIOLOGICAL RESOURCES ASSESSMENT

APPENDIX C:

CULTURAL RESOURCES ASSESSMENT

APPENDIX D:

GEOTECHNICAL AND INFILTRATION INVESTIGATION

APPENDIX E:

GREENHOUSE GAS IMPACT ANALYSIS

APPENDIX F:

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

APPENDIX G1:

DRAINAGE STUDY

APPENDIX G2:

PRELIMINARY WATER QUALITY MANAGEMENT PLAN

APPENDIX G3:

15TH STREET BASIN MODIFICATIONS REVIEW AND RECOMMENDATIONS

APPENDIX G4:

15TH STREET BASIN MODIFICATIONS – SPILLWAY AND BYPASS ALTERNATIVES

APPENDIX G5:

SLOPE STABILITY EVALUATION – NEW BASIN

APPENDIX H:

NOISE IMPACT ANALYSIS

APPENDIX I:

TRAFFIC IMPACT ANALYSIS

Upland Colonies

AIR QUALITY IMPACT ANALYSIS

CITY OF UPLAND

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LIST OF ABBREVIATED TERMS

(1)	Reference
$\mu g/m^3$	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.

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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 (µg/m^3)		80	77	72
Number of Samples		356	336	363
Number of Samples Exceeding State Standard	> 50 µg/m^3	9	12	5
Number of Samples Exceeding Federal Standard	> 150 µg/m^3	0	0	0
Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)				
Maximum 24-Hour Concentration (µg/m^3)		78.9	47.3	30.45
Annual Arithmetic Mean (µg/m^3)		13.2	10.7	12.04
Number of Samples Exceeding Federal 24-Hour Standard	> 35 µg/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

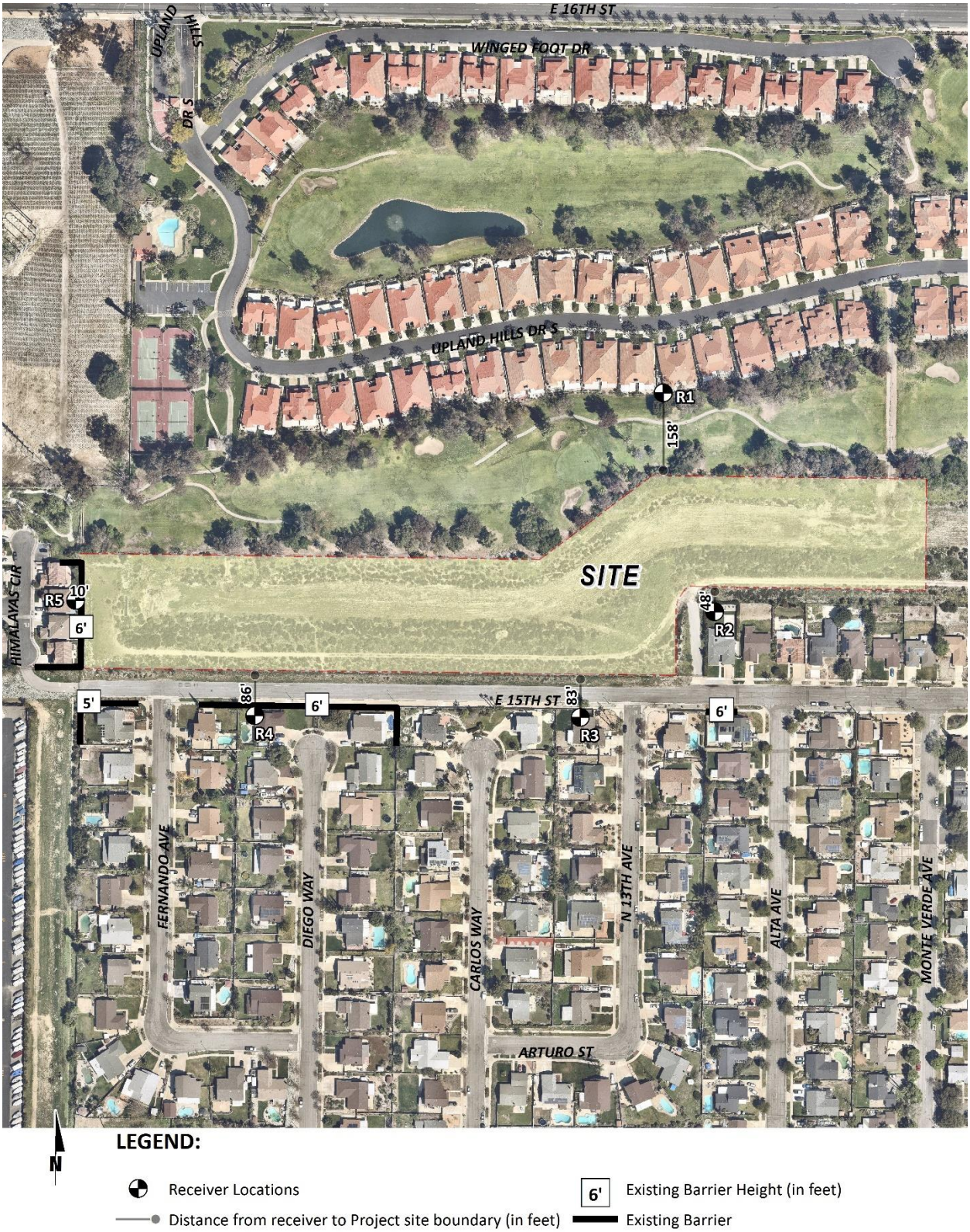
Sensitive Receptors

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.

<u>Construction Impacts</u>

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.

<u>Operational Impacts</u>

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.

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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

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

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

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

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

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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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
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Suite 100
Ontario, California 91764

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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** **2151 E. Convention Center Way, Suite 100** **Ontario, California 91764**
Principal Investigators:	**Randall C. Arnold, Jr., Principal Biologist** **Parker L. Smith, Biological Field Technician** **Blake Curran, Environmental Scientist/Biologist**
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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 auduboni*) 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 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 State: None	Coastal bluff scrub Coastal scrub	The site does not support suitable habitat for the species.
Southern California legless lizard (*Anniella stebbinsi*)	Fed: None State: None	Broadleaved upland forest Chaparral Coastal dunes Coastal scrub	The site does not support suitable habitat for the species.
Plummer's mariposa-lily (*Calochortus plummerae*)	Fed: None State: None	Chaparral Cismontane woodland Coastal scrub Lower montane coniferous forest Valley & foothill grassland	The site does not support suitable habitat for the species.
Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	Fed: None State: None	Chaparral Coastal scrub	The site does not support suitable habitat for the species.
San Bernardino kangaroo rat (*Chorizanthe xanti var. leucotheca*)	Fed: E State: None	Coastal scrub	The site does not support suitable habitat for the species.
Slender-horned spineflower (*Dodecahema leptoceras*)	Fed: E State: E	Chaparral Cismontane woodland Coastal scrub	The site does not support suitable habitat for the species.
Burrowing owl (*Athene cunicularia*)	Fed: None 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 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 State: T	Riparian forest Riparian woodland 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 State: None Fed: None State: None	Meadow & seep Riparian scrub	The site does not support suitable habitat for the species.
California saw-grass (*Cladium californicum*)	Fed: None State: None	Alkali marsh Freshwater marsh Meadow & seep Wetland	The site does not support suitable habitat for the species.
California diplectronan caddisfly (*Diplectrona californica*)	Fed: None State: None	Aquatic	The site does not support suitable habitat for the species.
Western mastiff bat (*Eumops perotis californicus*)	Fed: None State: None	Chaparral Cismontane woodland Coastal scrub 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 State: None	Chaparral Cismontane woodland Coastal scrub	The site does not support suitable habitat for the species.
Western yellow bat (*Lasiurus xanthinus*)	Fed: None State: None	Desert wash	The site does not support suitable habitat for the species.
California black rail (*Laterallus jamaicensis coturniculus*)	Fed: None State: T	Brackish marsh Freshwater marsh Marsh & swamp Salt marsh Wetland	The site does not support suitable habitat for the species.
Robinson's pepper-grass (Lepidium virginicum var. robinsonii)	Fed: None State: None	Chaparral 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 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 State: None	Chaparral Coastal scrub Lower montane coniferous forest 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 State: None	Coastal scrub Meadow & seep Valley & foothill grassland Vernal pool	The site does not support suitable habitat for the species.

		Wetland	
San Diego desert woodrat (*Neotoma lepida intermedia*)	Fed: None 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 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 State: None	Chaparral Cismontane woodland Coastal scrub 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 State: None	Alkali playa Chaparral Coastal scrub Lower montane coniferous forest Mojavean desert scrub Wetland	The site does not support suitable habitat for the species.
San Bernardino aster (*Symphyotrichum defoliatum*)	Fed: None State: None	Cismontane woodland Coastal scrub Lower montane coniferous forest Marsh & swamp Meadow & seep 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 State: None	Marsh & swamp Riparian scrub Riparian woodland Wetland	The site does not support suitable habitat for the species.
Rigid fringepod (*Thysanocarpus rigidus*)	Fed: None State: None	Pinon & juniper woodlands	The site does not support suitable habitat for the species.
Coast horned lizard (*Phrynosoma blainvillii*)	Fed: None State: None	Desert scrub 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 15th to August 31st.

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.

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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

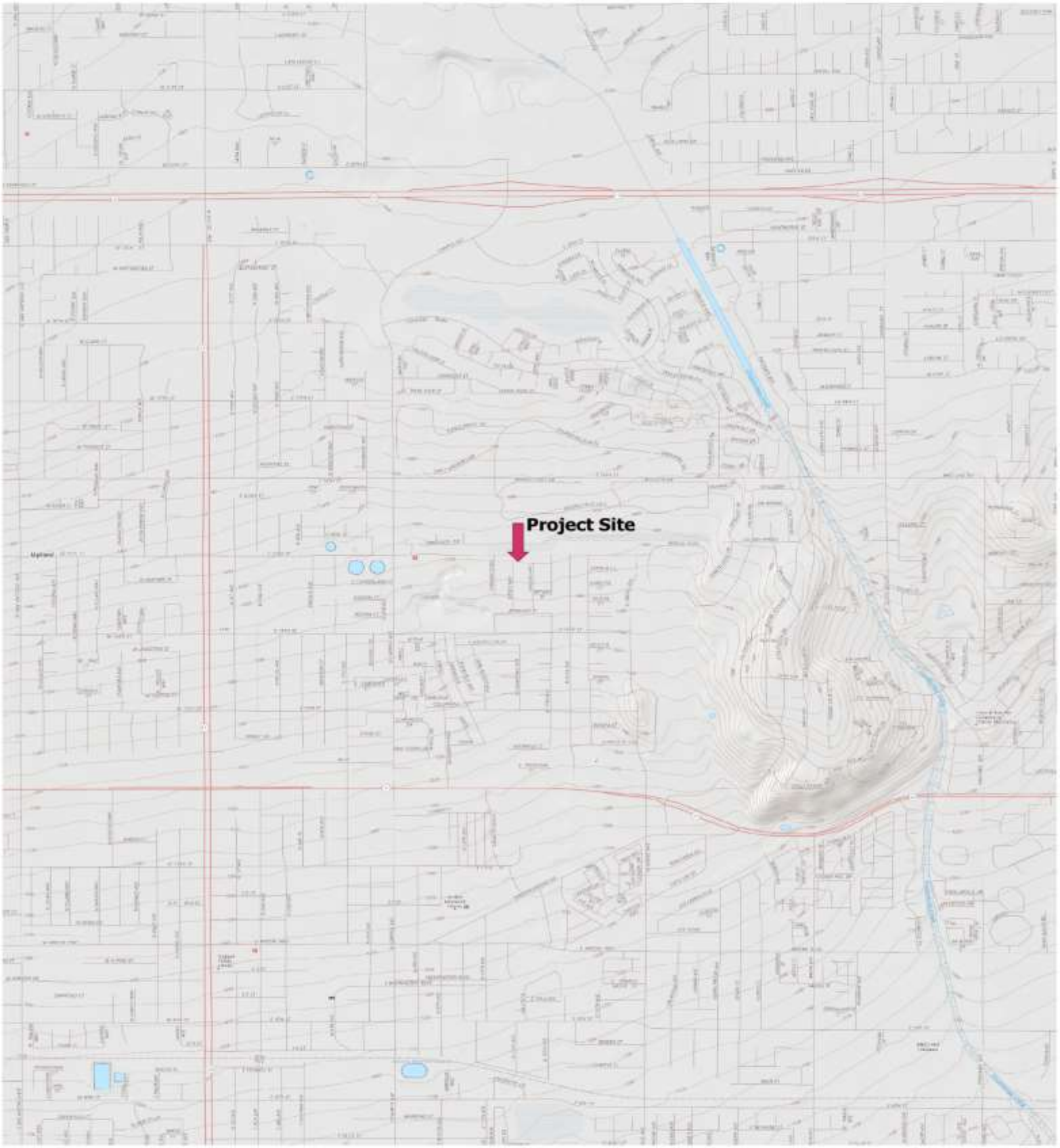
2.5 0 2.5 5 7.5 10 mi

N

RCA ASSOCIATES, INC

Figure 2

Topographic Map



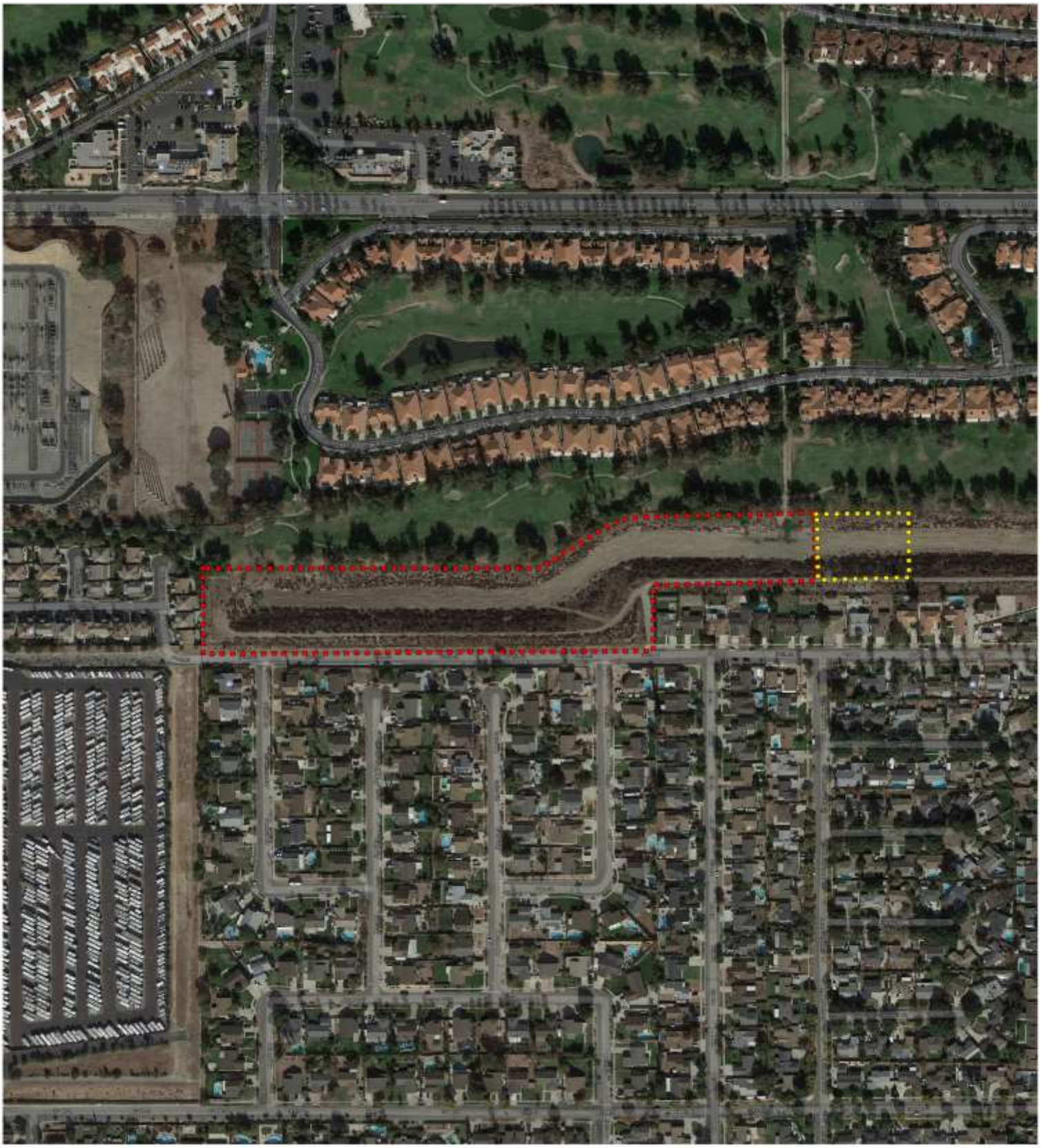
0.25 0 0.25 0.5 0.75 1 mi

N

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.

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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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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Appendix C- Resumes

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.

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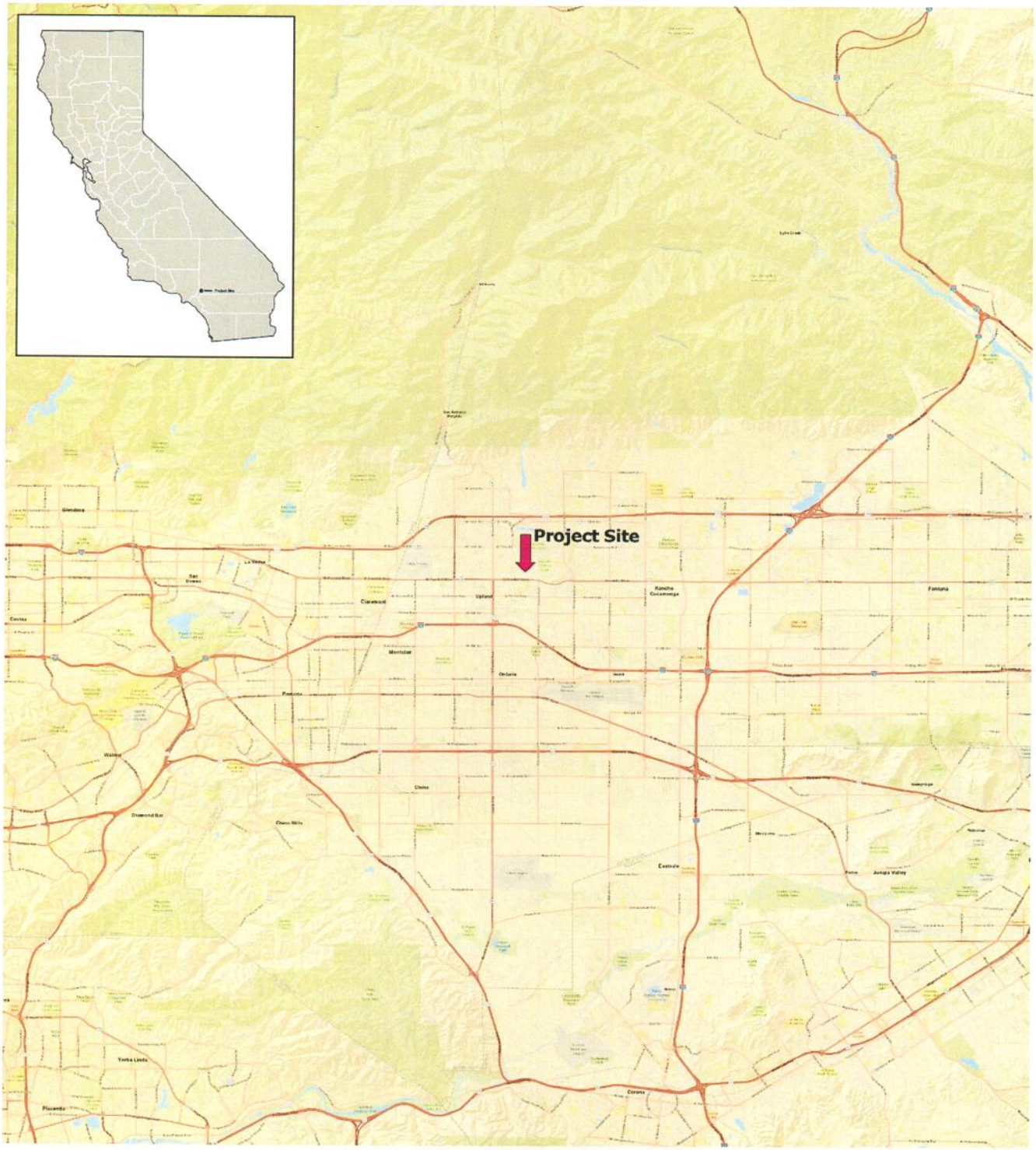
APPENDIX A

FIGURES

Figure 1

Regional Vicinity Map



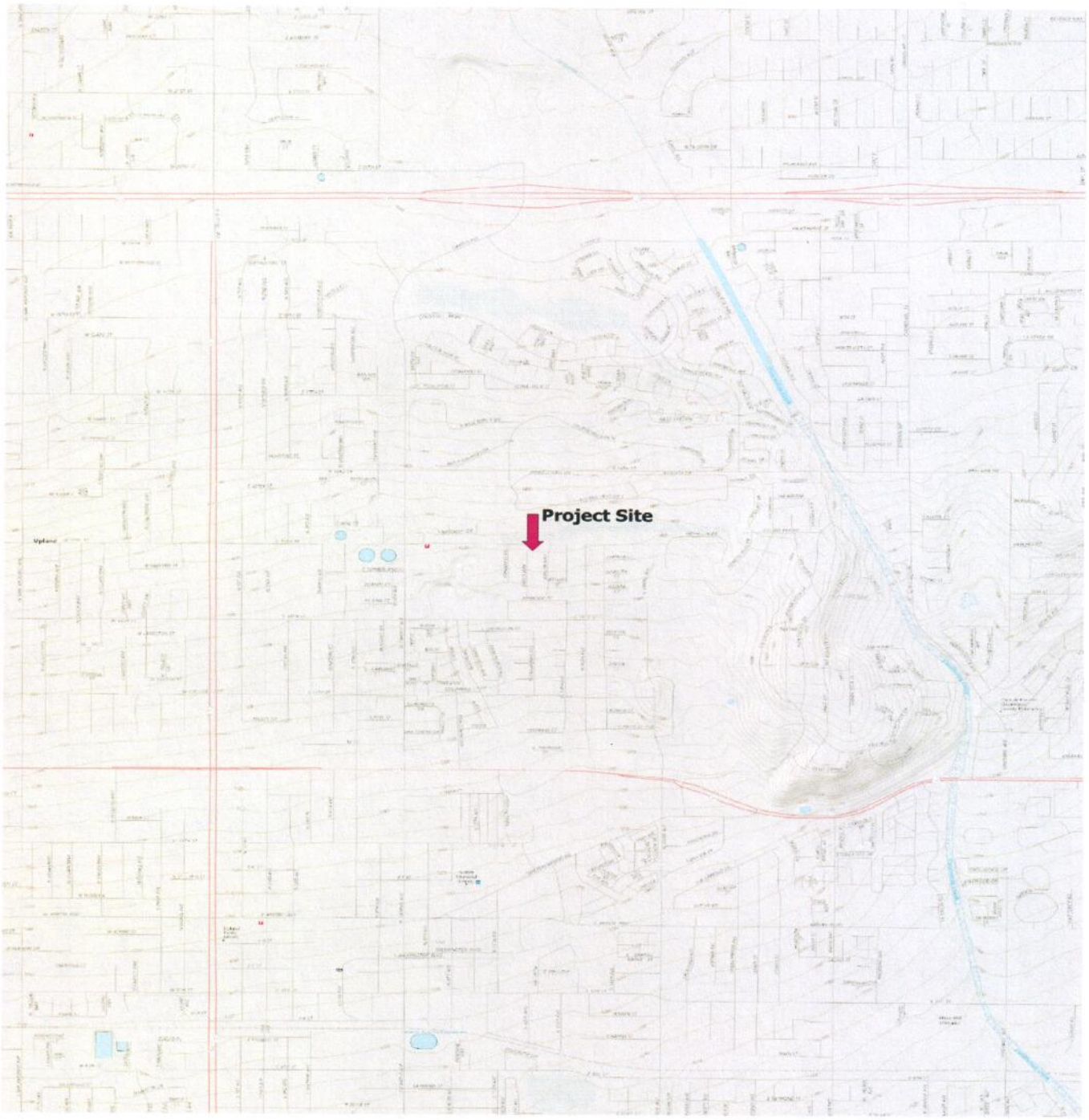
2.5 0 2.5 5 7.5 10 mi

N

RCA ASSOCIATES, INC

Figure 2

Topographic Map



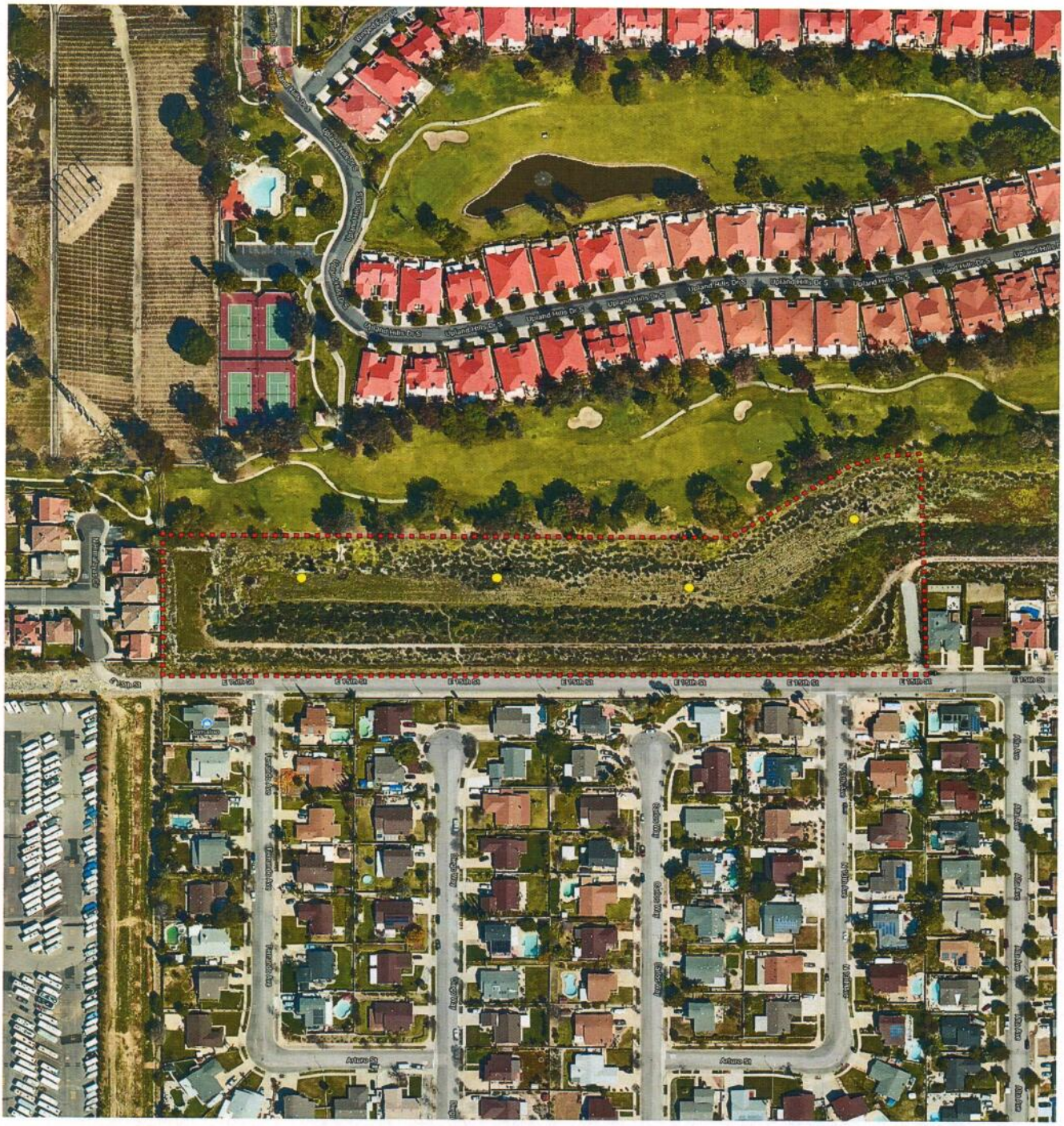
0.25 0 0.25 0.5 0.75 1 mi

N

RCA ASSOCIATES, INC

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

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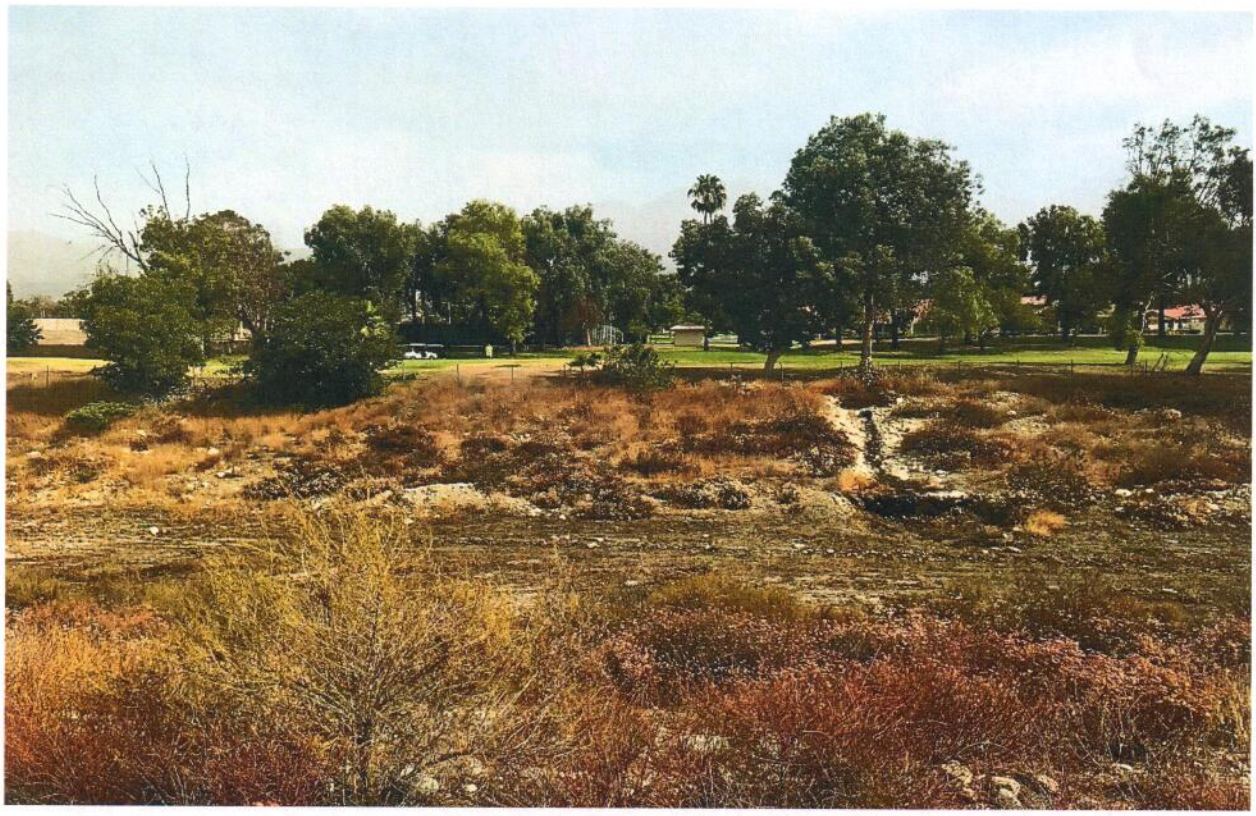
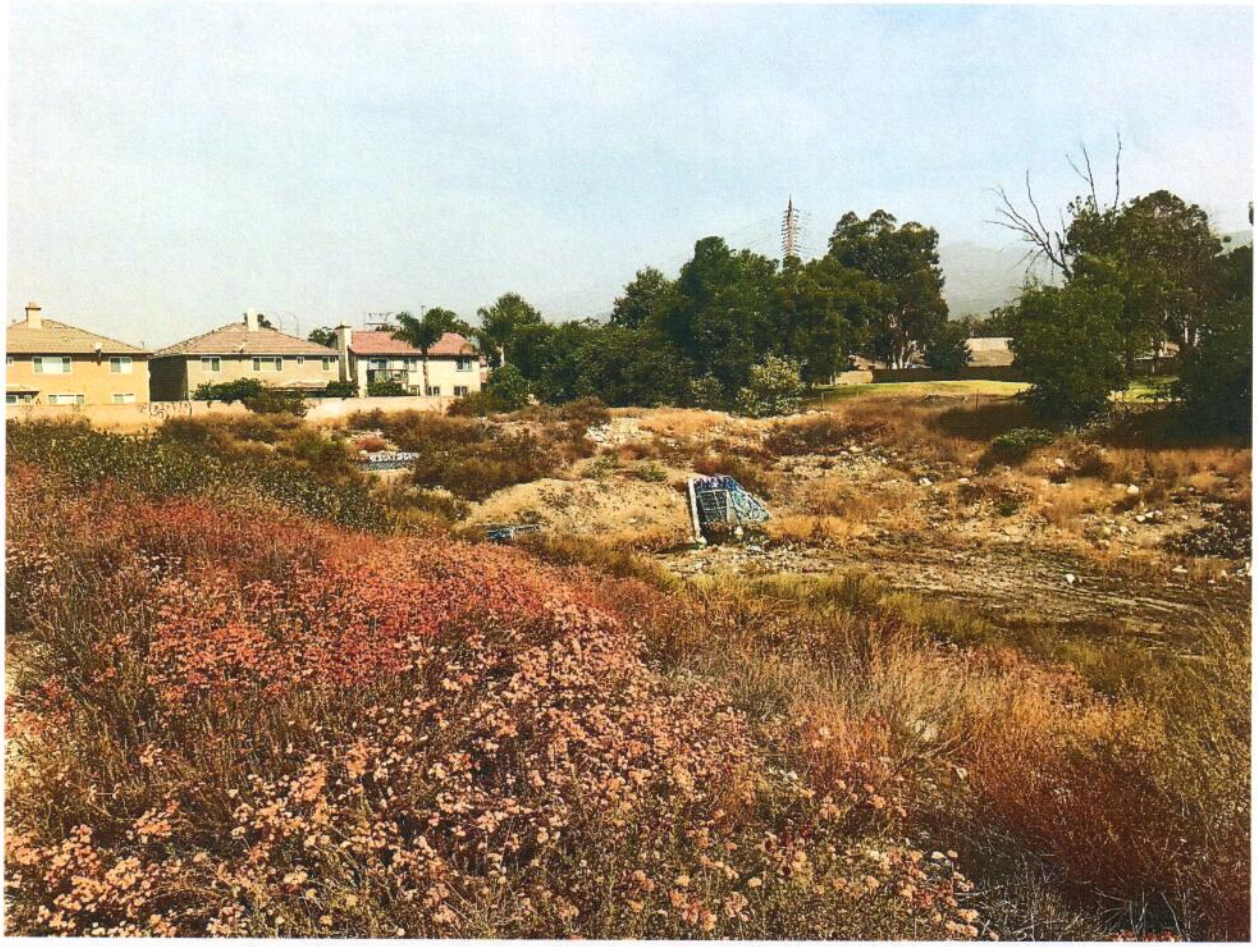
SITE PHOTOS



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

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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
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**

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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Figure 2 – Trench Location Map

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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 15th 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 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

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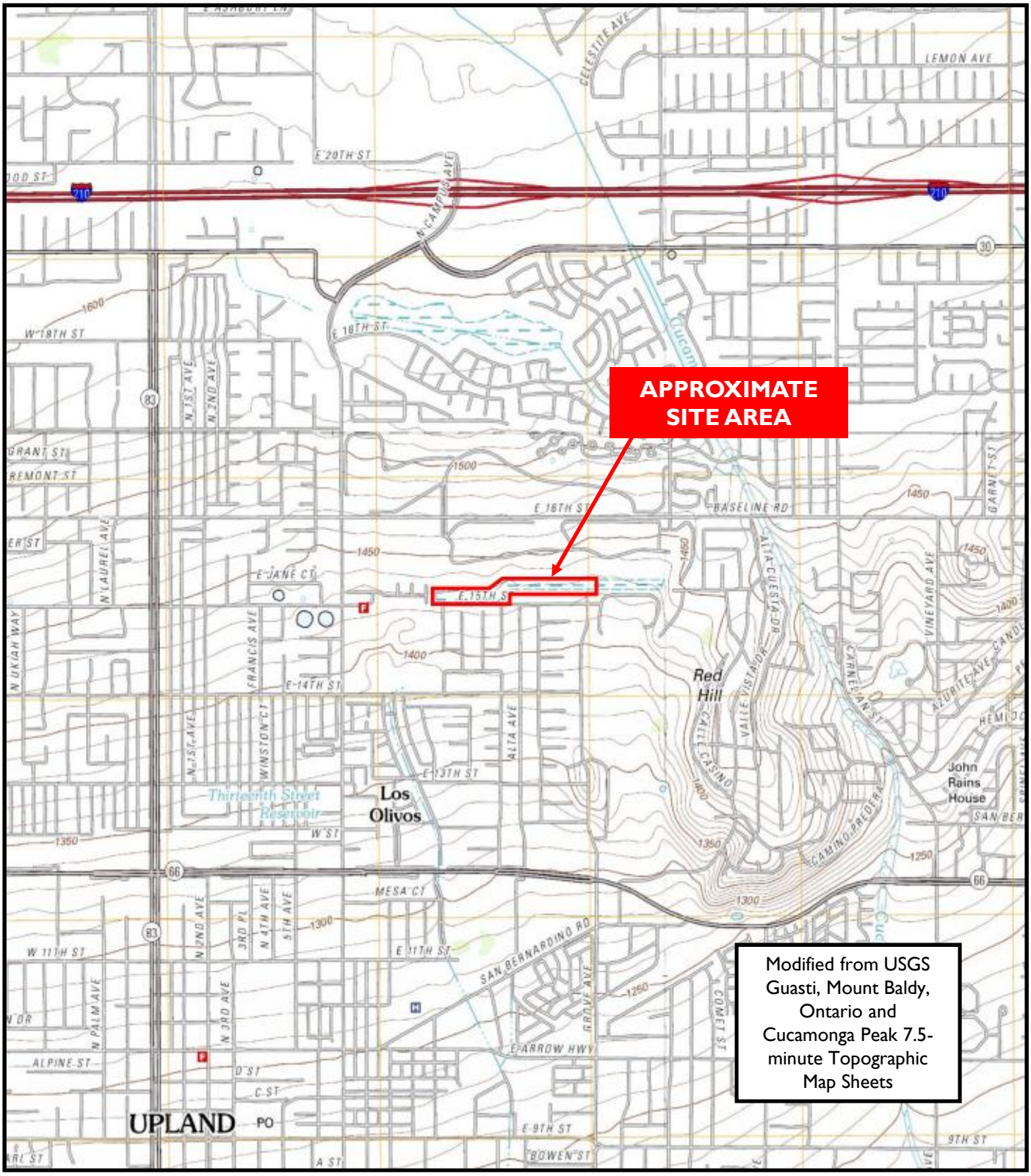


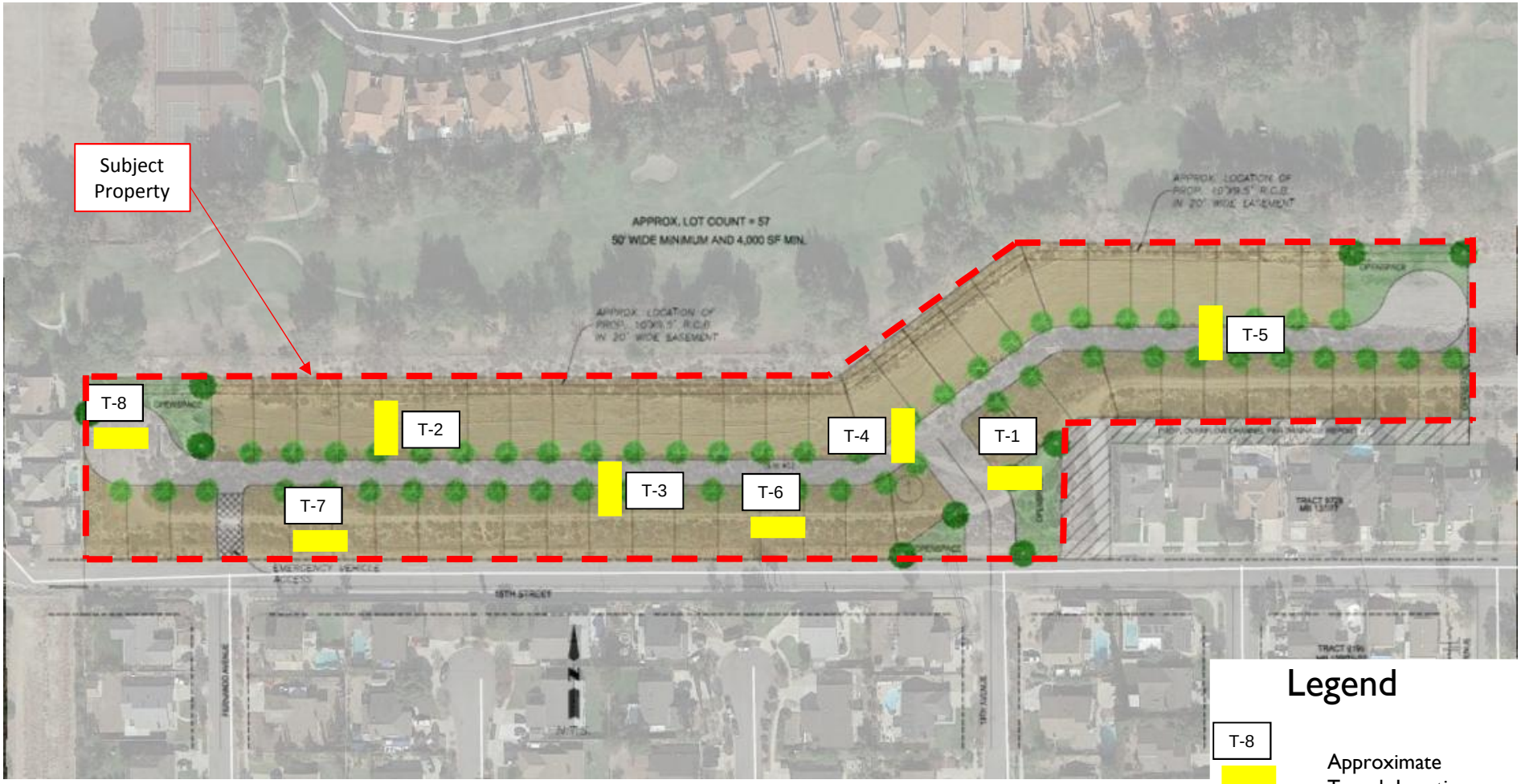
Frontier Enterprises
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

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** Silty gravelly f-c SAND, gray, dry, some cobbles, some roots			EI, SR
			GP	F-c sandy GRAVEL, brownish gray, slightly moist, few cobbles 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) 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-3** — **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**UNDOCUMENTED ARTIFICIAL FILL** Silty f-c SAND, gray, dry, some gravel, few cobbles, some roots			
5			SP	**ALLUVIUM** Gravelly f-c SAND, grayish brown, slightly moist, few cobbles, one large boulder up to 24" Same as above, trace rootlets			
10 15				**TRENCH TERMINATED AT 6 FEET (REFUSAL)** No groundwater Backfilled with excavated soils			

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** Silty f-c SAND, brownish gray, dry, some gravel, few cobbles, some roots			
5			SP	F-c SAND, brown, slightly moist to moist, some gravel, trace cobble, few rootlets Same as above, no rootlets			
10 15				**TRENCH TERMINATED AT 6 FEET (REFUSAL)** No groundwater Backfilled with excavated soils			

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** 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** 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

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: E15TH 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-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
								PREWATER 5GAL
	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, Δt =	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, Δt =	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.

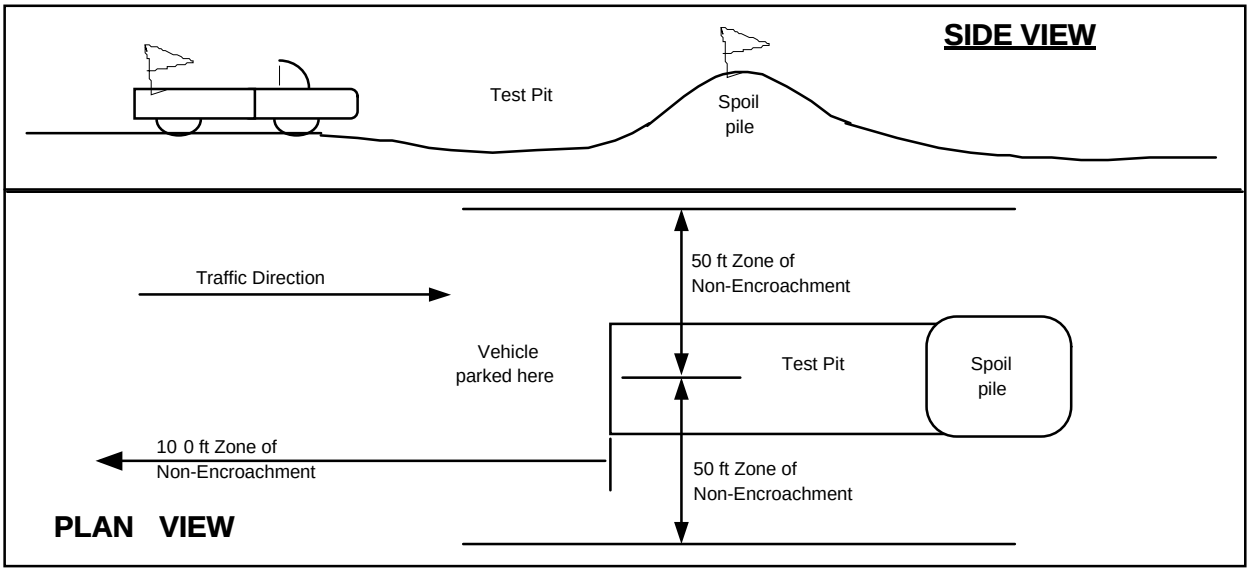
Test Pits Location, Orientation and Clearance

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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Upland Colonies

GREENHOUSE GAS ANALYSIS

CITY OF UPLAND

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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 4th 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

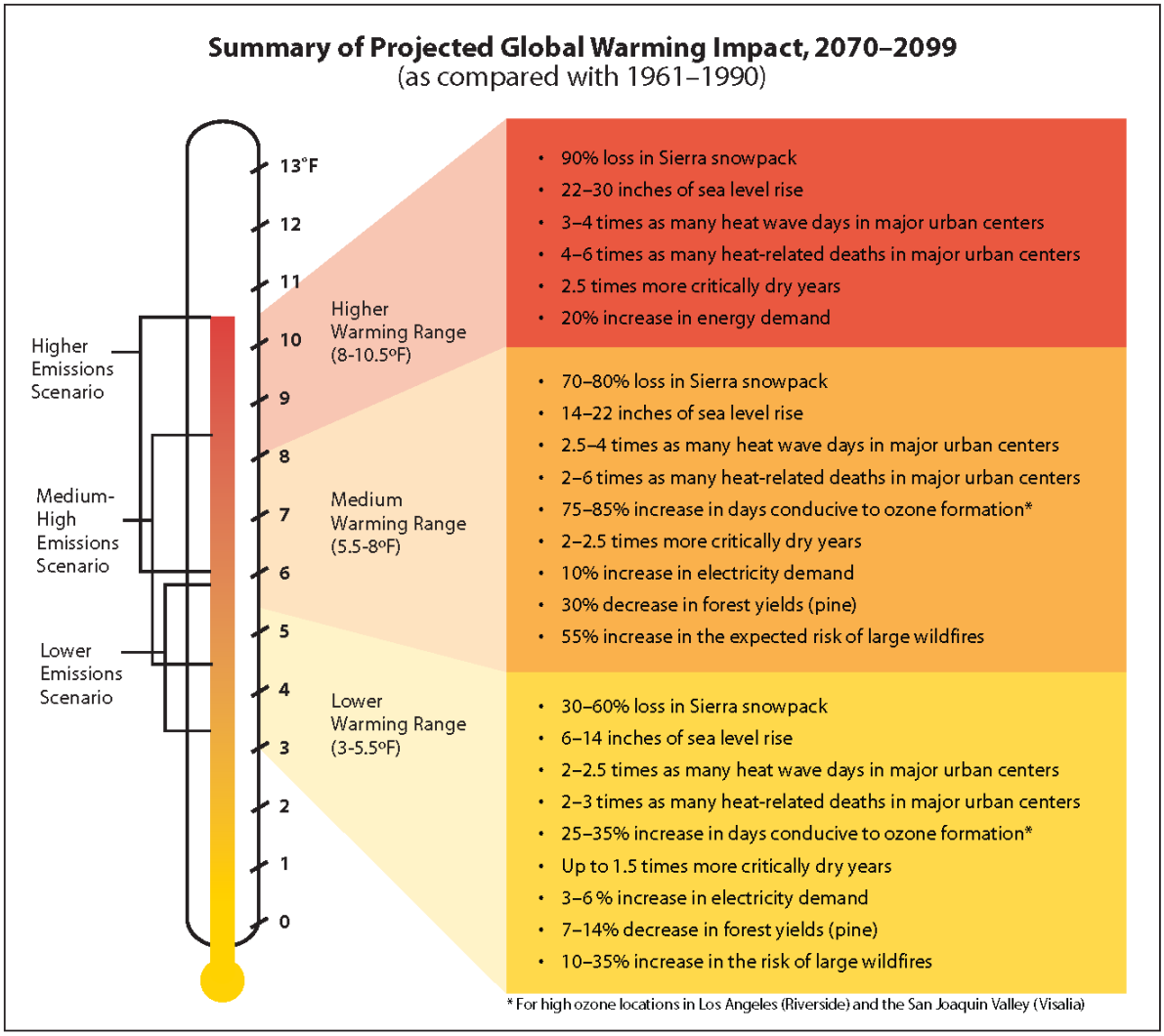
The potential health effects related directly to the emissions of carbon dioxide, methane, and nitrous oxide as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to global climate change have the potential to 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).

<u>2017 Climate Change Scoping Plan Update</u>

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

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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**

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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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.

REGISTERED GEOLOGIST
EDWARD H. LaMONT
No. 1892
Exp.
Certified Engineering Geologist
STATE OF CALIFORNIA

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

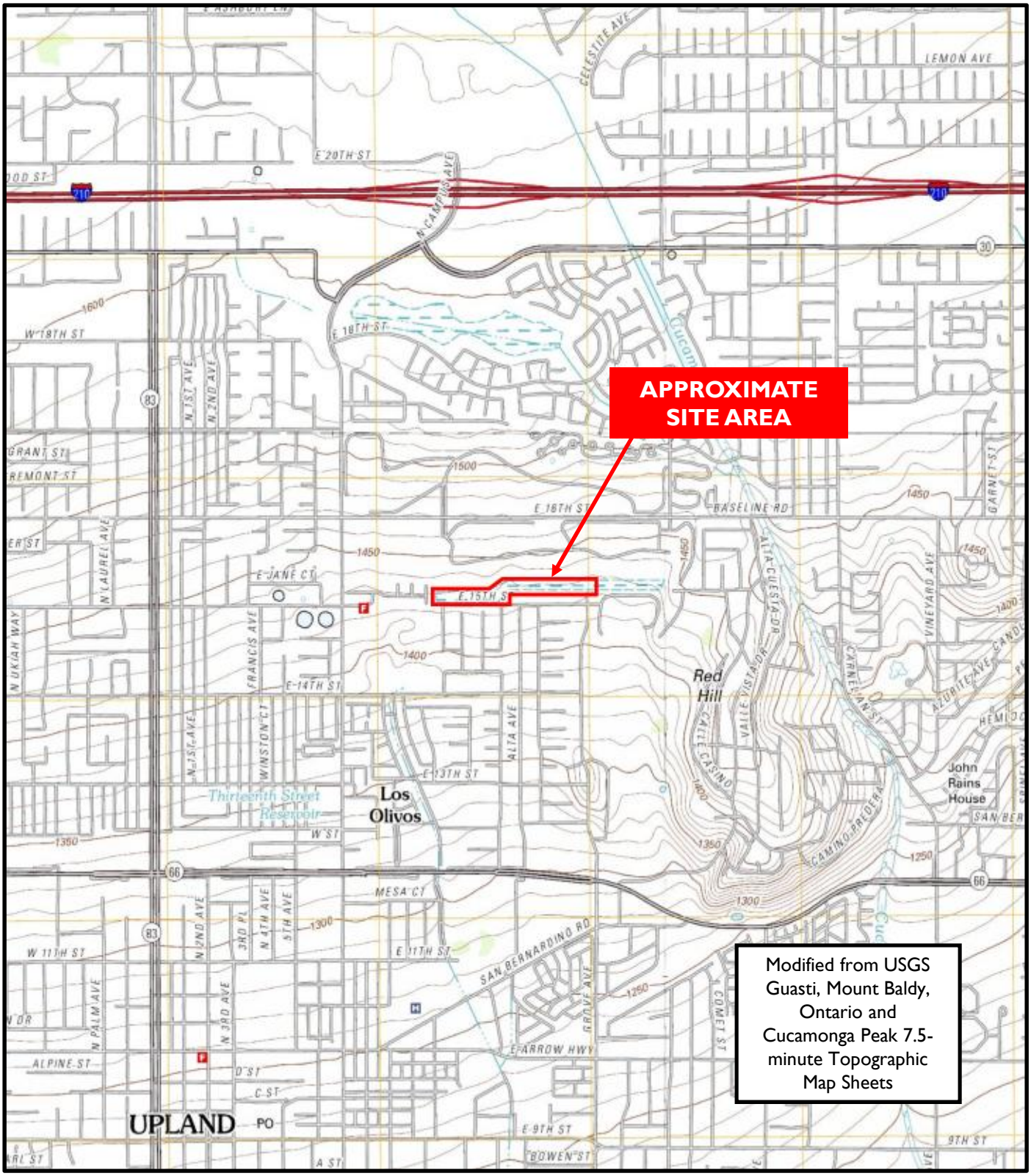
- Police Department, Records Inquiry.

U.S. GOVERNMENT

- Drug Enforcement Agency
- Records inquiry, http://www.dea.gov/seizures
- Federal Emergency Management Agency (FEMA)

APPENDIX A

FIGURES



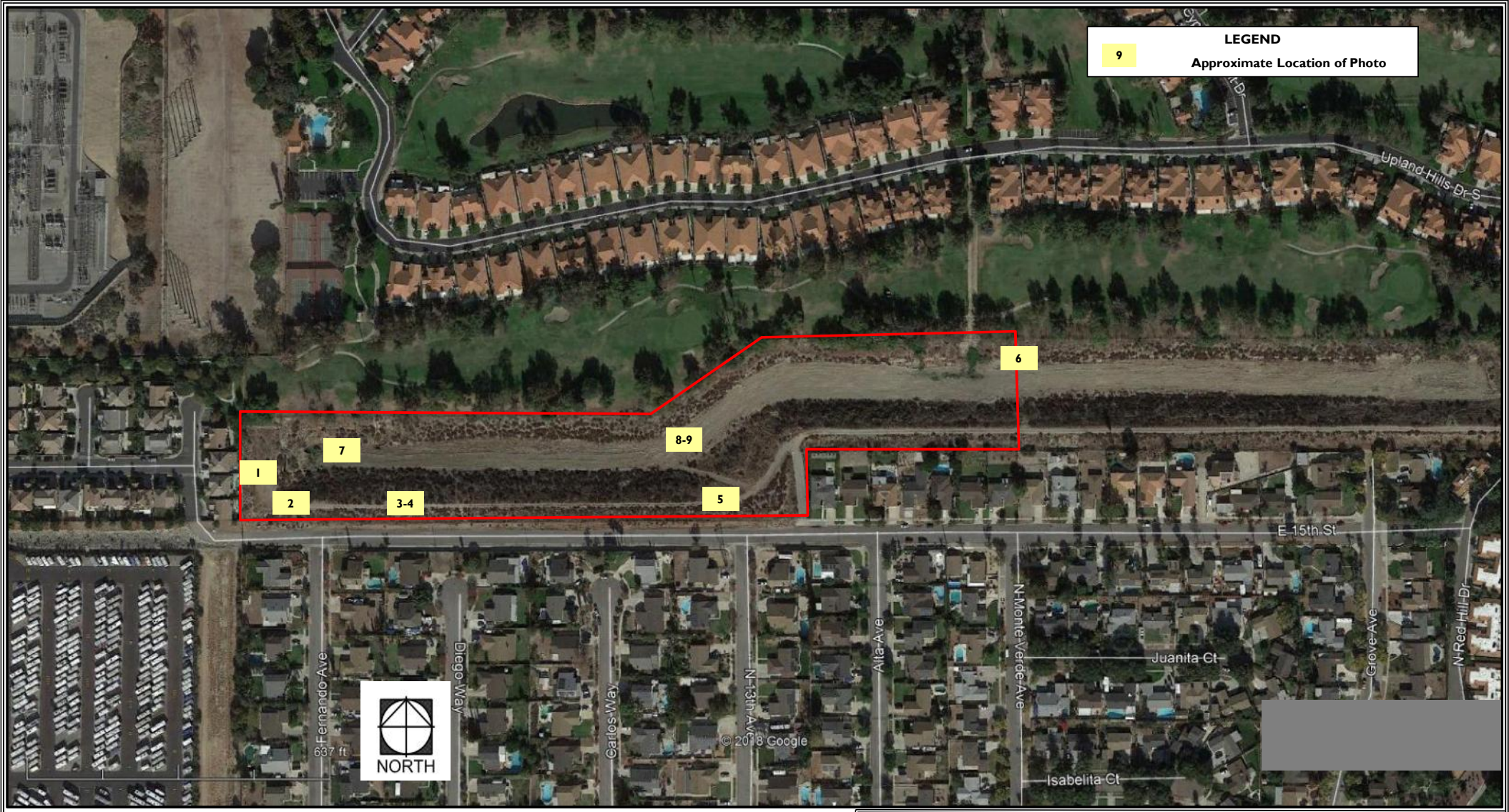
Frontier Enterprises
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

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

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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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City Directory Images

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

FINDINGS

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

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.

FINDINGS

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

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

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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

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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

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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

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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:	Client Name:
Upland Site	Geotek
East 15th Street/North 13th Av	1548 North Maple Street
Upland, CA 91786	Corona, CA 92880
EDR Inquiry # 5331724.4	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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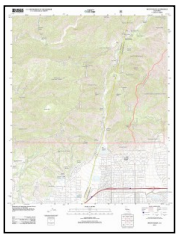
Topo Sheet Key

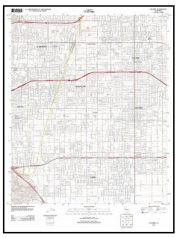
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets

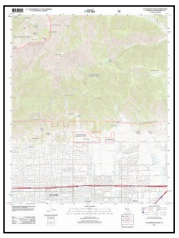
Guasti
2012
7.5-minute, 24000



Mount Baldy
2012
7.5-minute, 24000



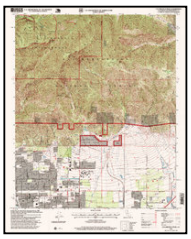
Ontario
2012
7.5-minute, 24000



Cucamonga Peak
2012
7.5-minute, 24000

1995, 1996 Source Sheets

Mount Baldy
1995
7.5-minute, 24000
Aerial Photo Revised 1988



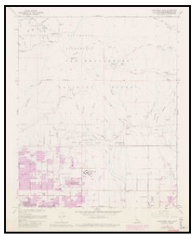
Cucamonga Peak
1996
7.5-minute, 24000
Aerial Photo Revised 1952

1988 Source Sheets

Cucamonga Peak
1988
7.5-minute, 24000
Aerial Photo Revised 1985

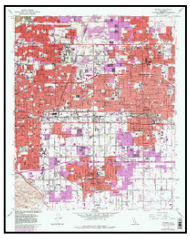
Mt. Baldy
1988
7.5-minute, 24000
Aerial Photo Revised 1985

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

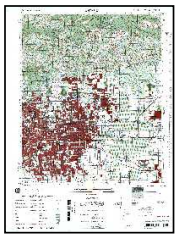


Ontario
1981
7.5-minute, 24000
Aerial Photo Revised 1978

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1976 Source Sheets



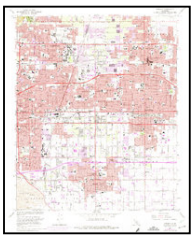
ONTARIO
1976
15-minute, 50000

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



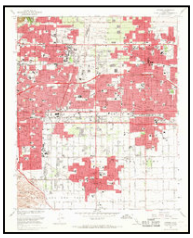
Ontario
1973
7.5-minute, 24000
Aerial Photo Revised 1973

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.

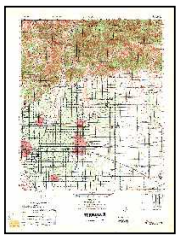
1953, 1954 Source Sheets

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



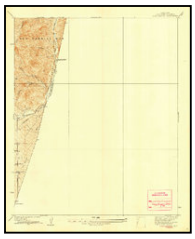
CUCAMONGA
1944
15-minute, 50000

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

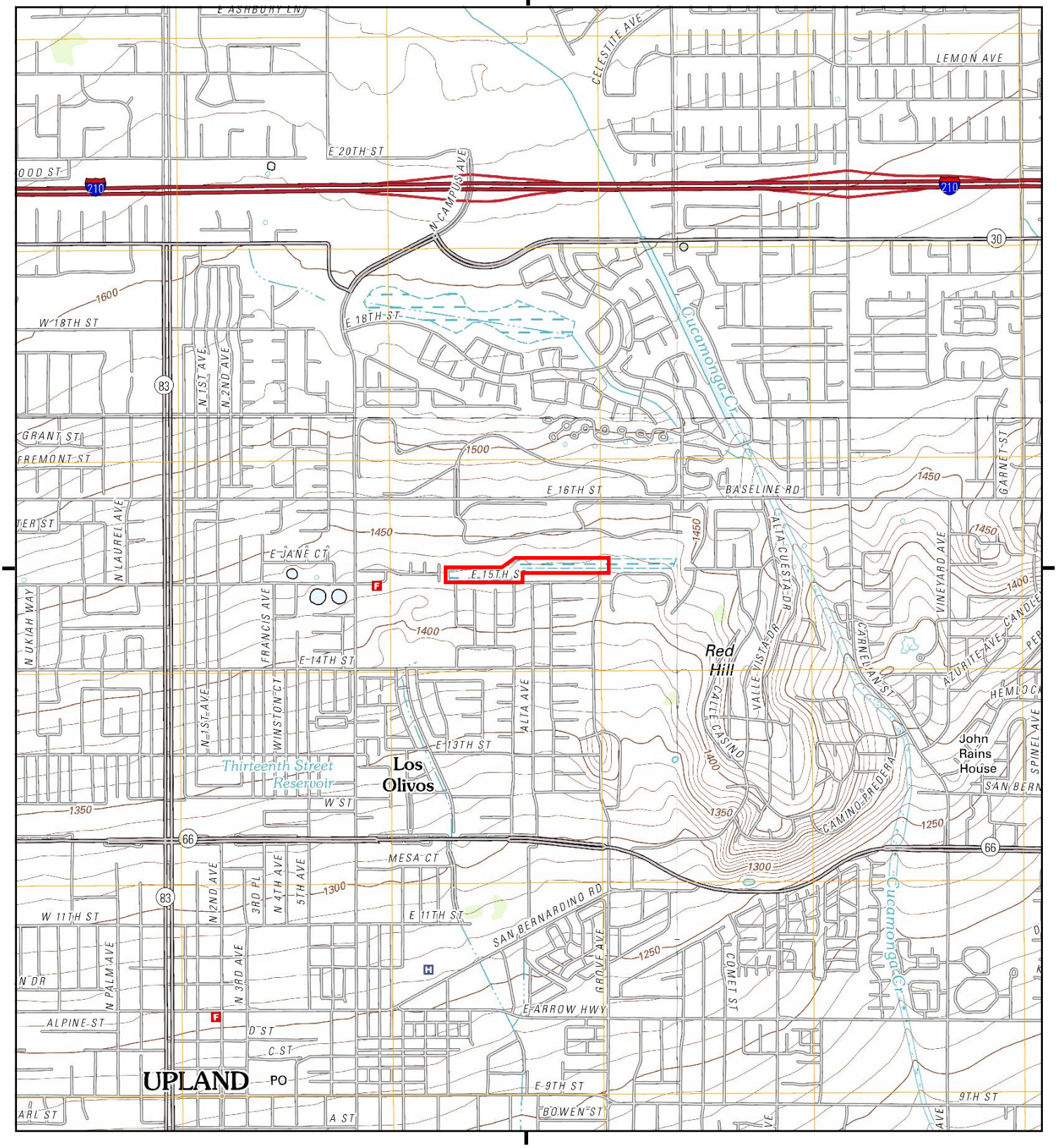
Cucamonga
1900
15-minute, 62500

1897 Source Sheets

Cucamonga
1897
15-minute, 62500

Historical Topo Map

2012



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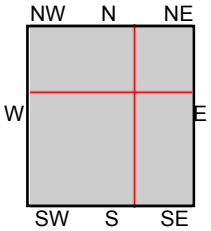


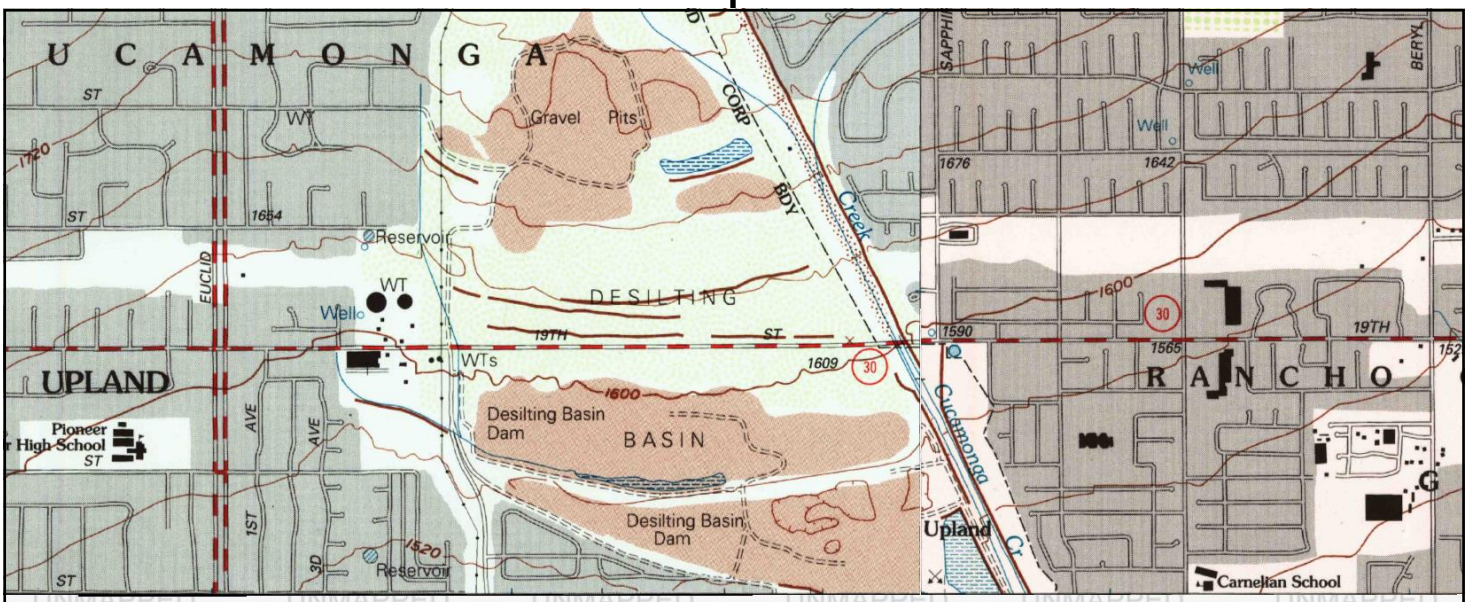
TP, Ontario, 2012, 7.5-minute
NE, Cucamonga Peak, 2012, 7.5-minute
SE, Guasti, 2012, 7.5-minute
NW, Mount Baldy, 2012, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

Historical Topo Map

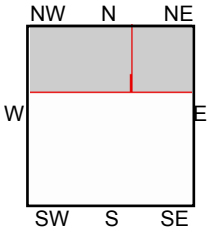
1995, 1996



UNMAPPED

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



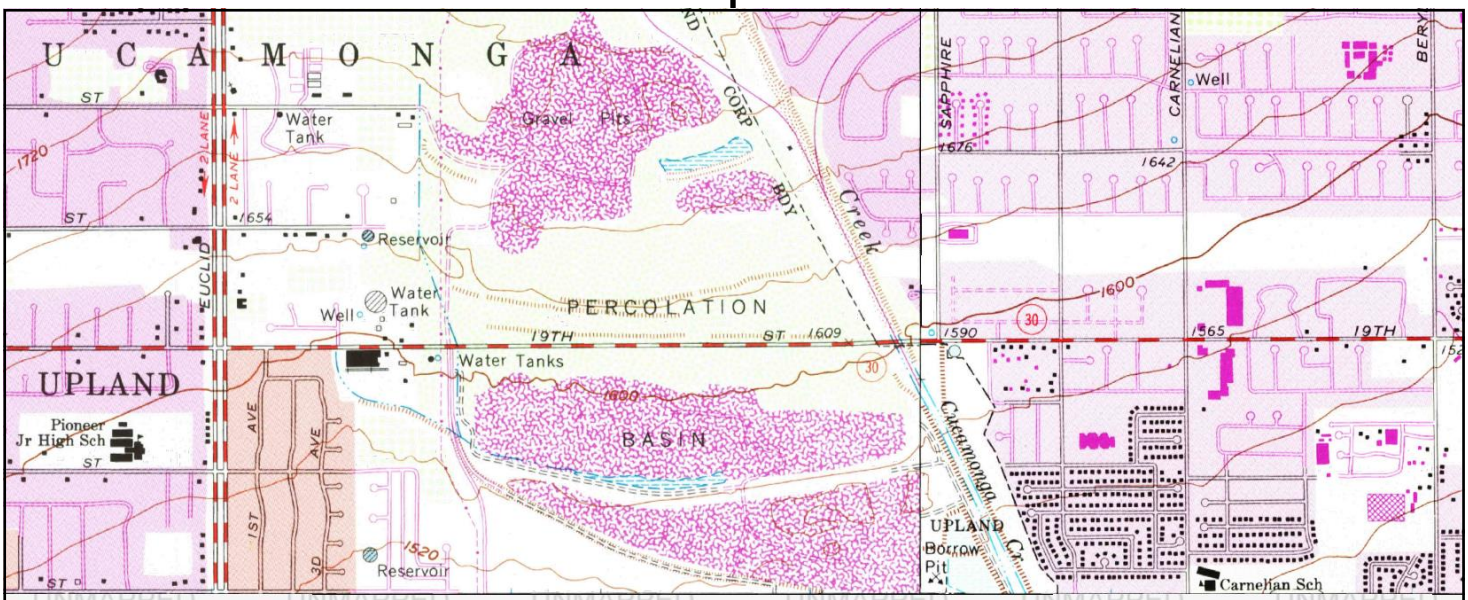
NE, Cucamonga Peak, 1996, 7.5-minute
NW, Mount Baldy, 1995, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

Historical Topo Map

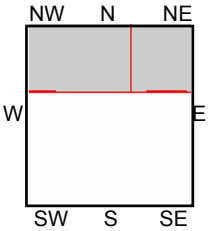
1988



UNMAPPED

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



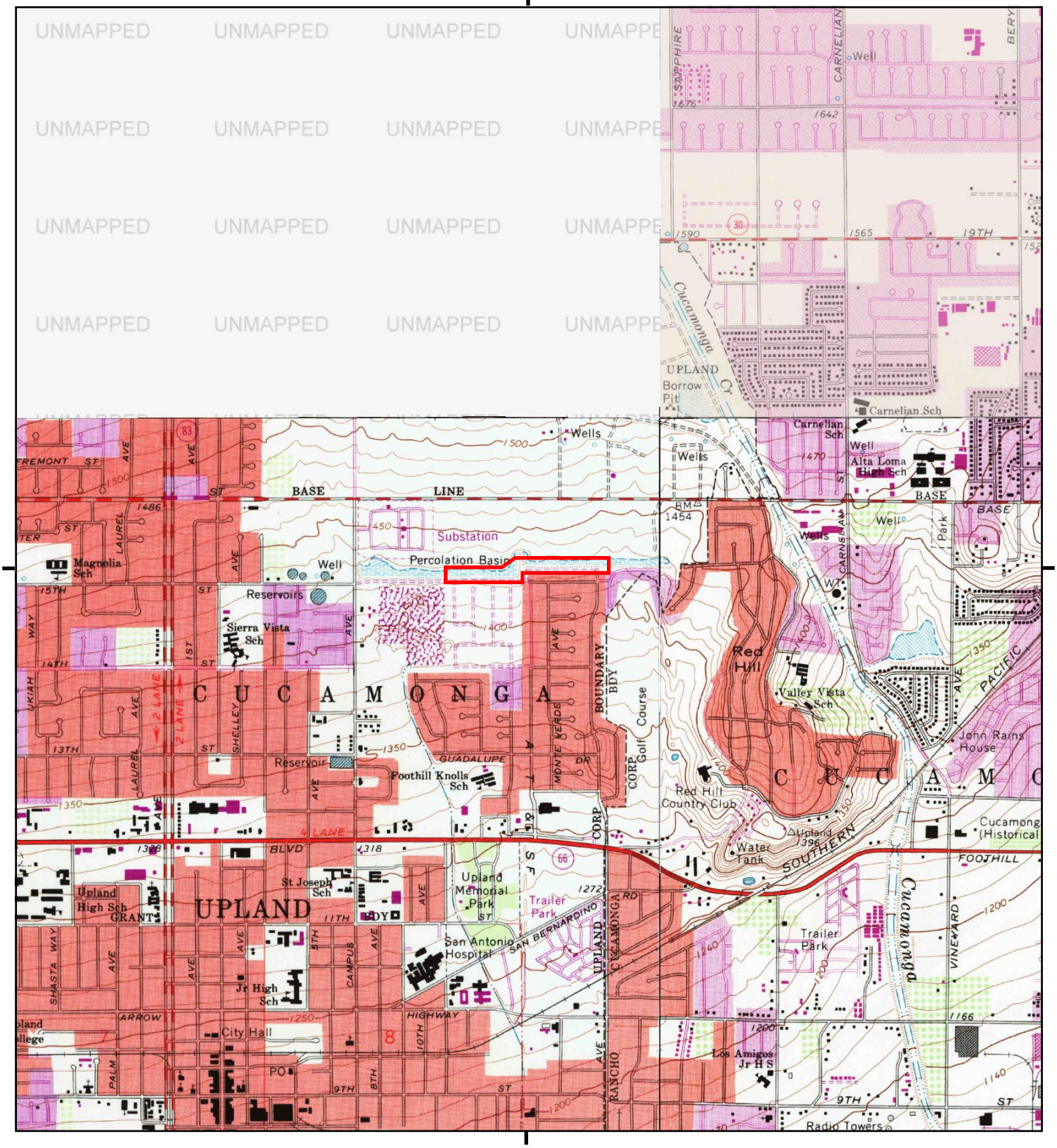
NE, Cucamonga Peak, 1988, 7.5-minute
NW, Mt. Baldy, 1988, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

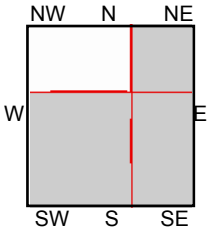
Historical Topo Map

1980, 1981



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



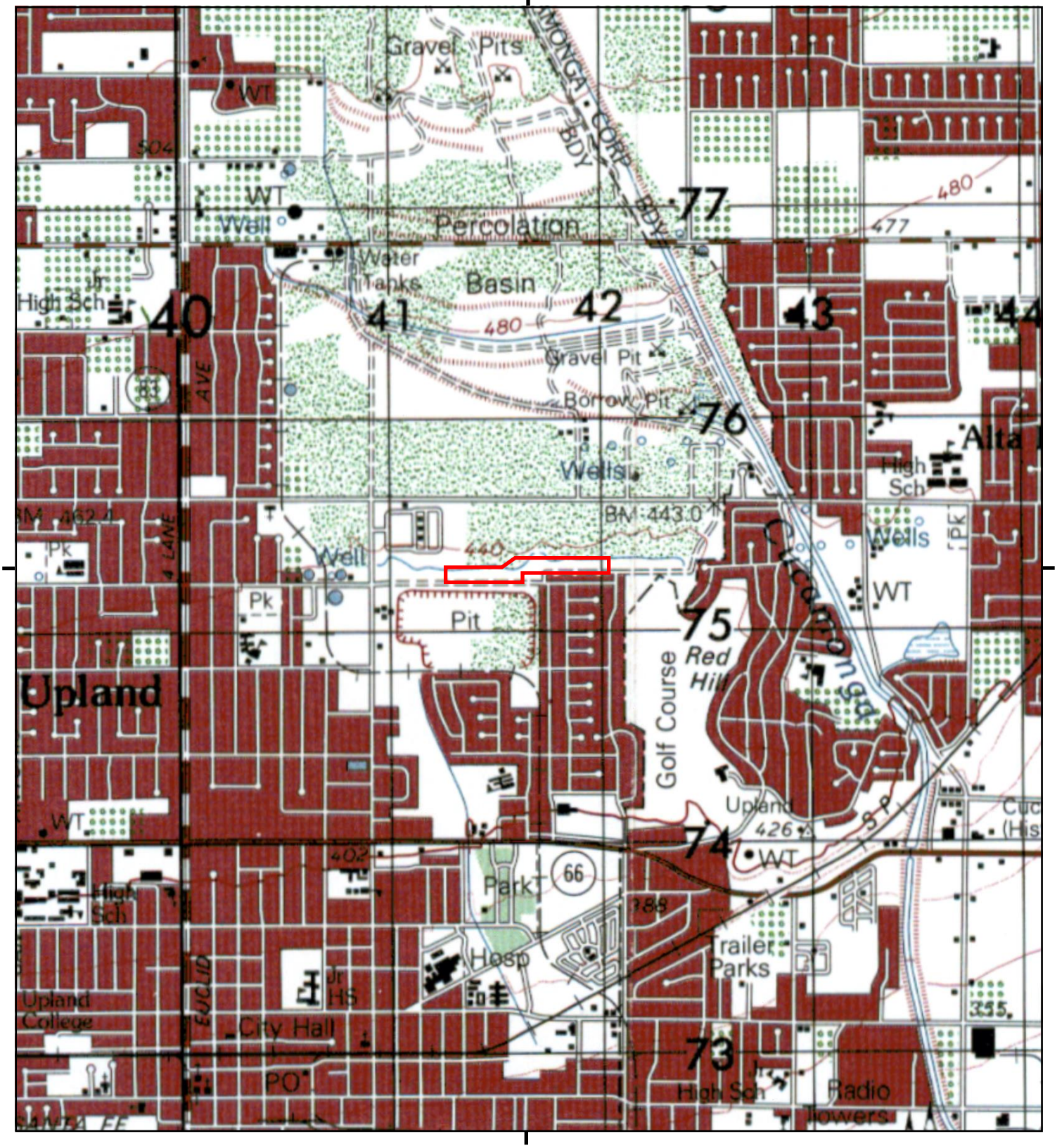
TP, Ontario, 1981, 7.5-minute
NE, Cucamonga Peak, 1980, 7.5-minute
SE, Guasti, 1981, 7.5-minute

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

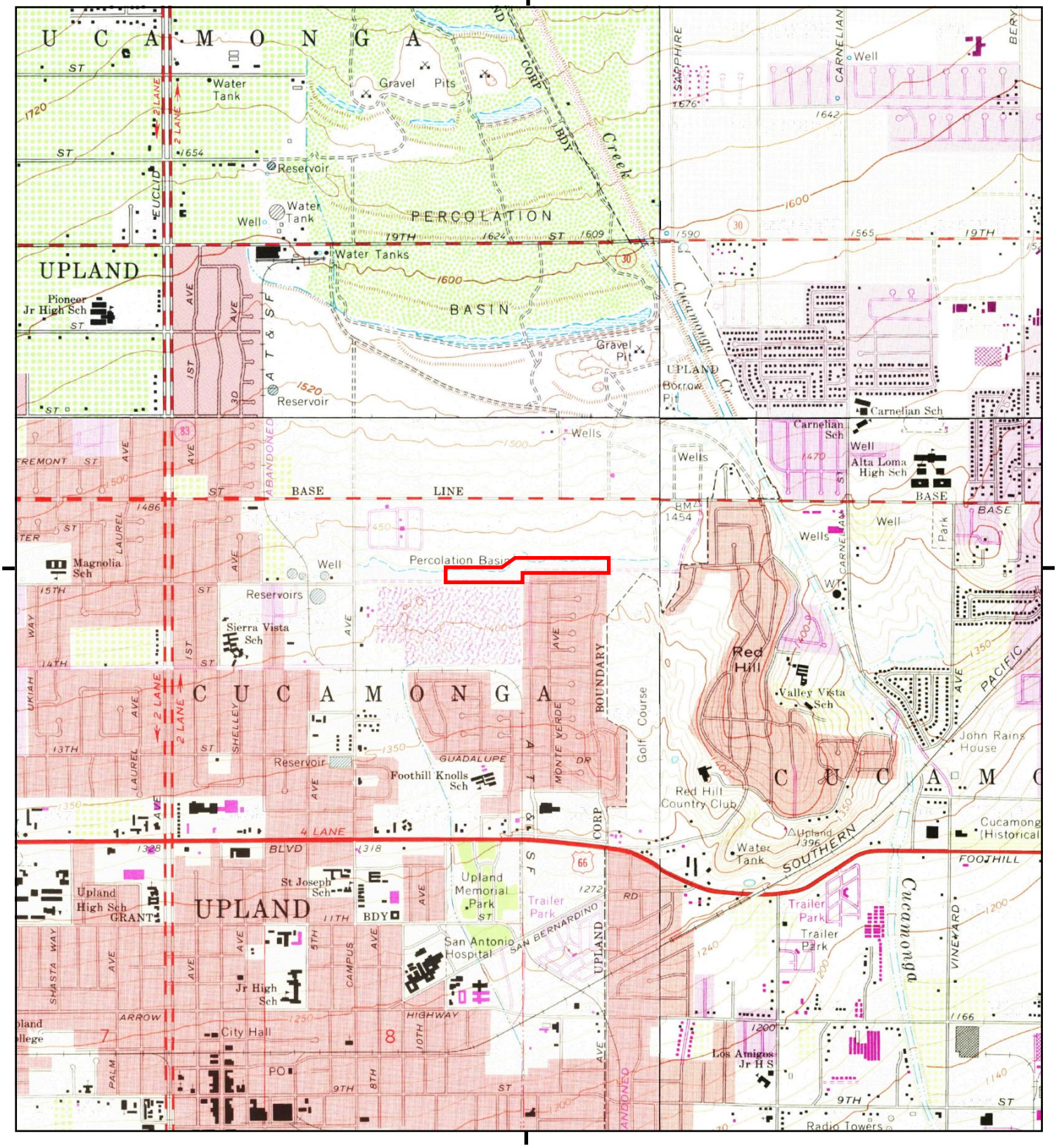
TP, ONTARIO, 1976, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

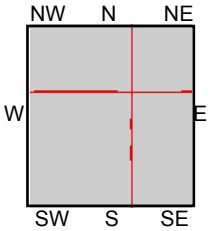
Historical Topo Map

1973



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



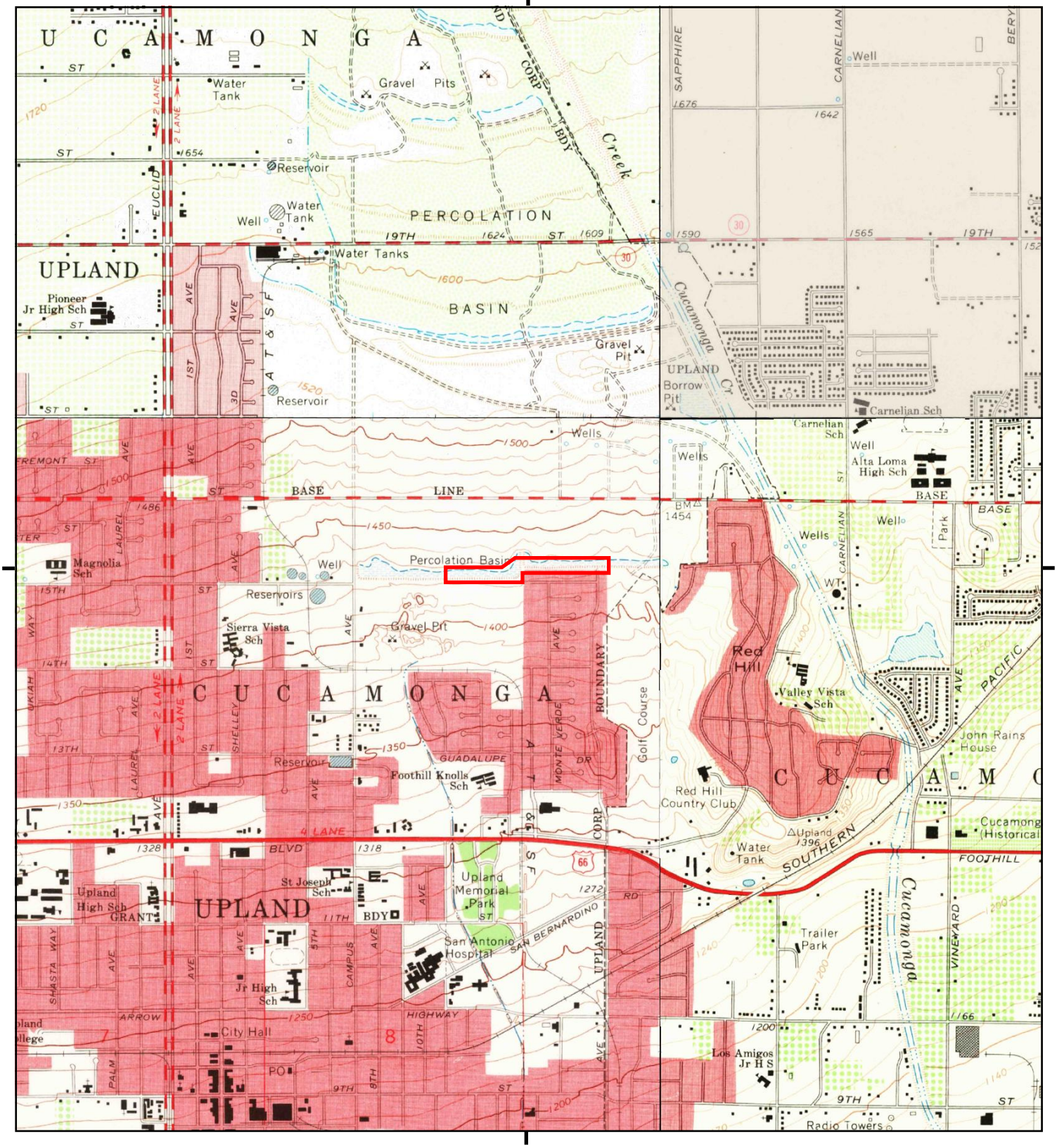
TP, Ontario, 1973, 7.5-minute
NE, Cucamonga Peak, 1973, 7.5-minute
SE, Guasti, 1973, 7.5-minute
NW, Mt. Baldy, 1973, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

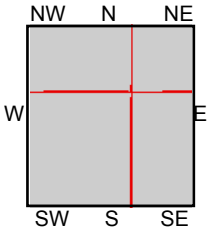
Historical Topo Map

1966, 1967



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



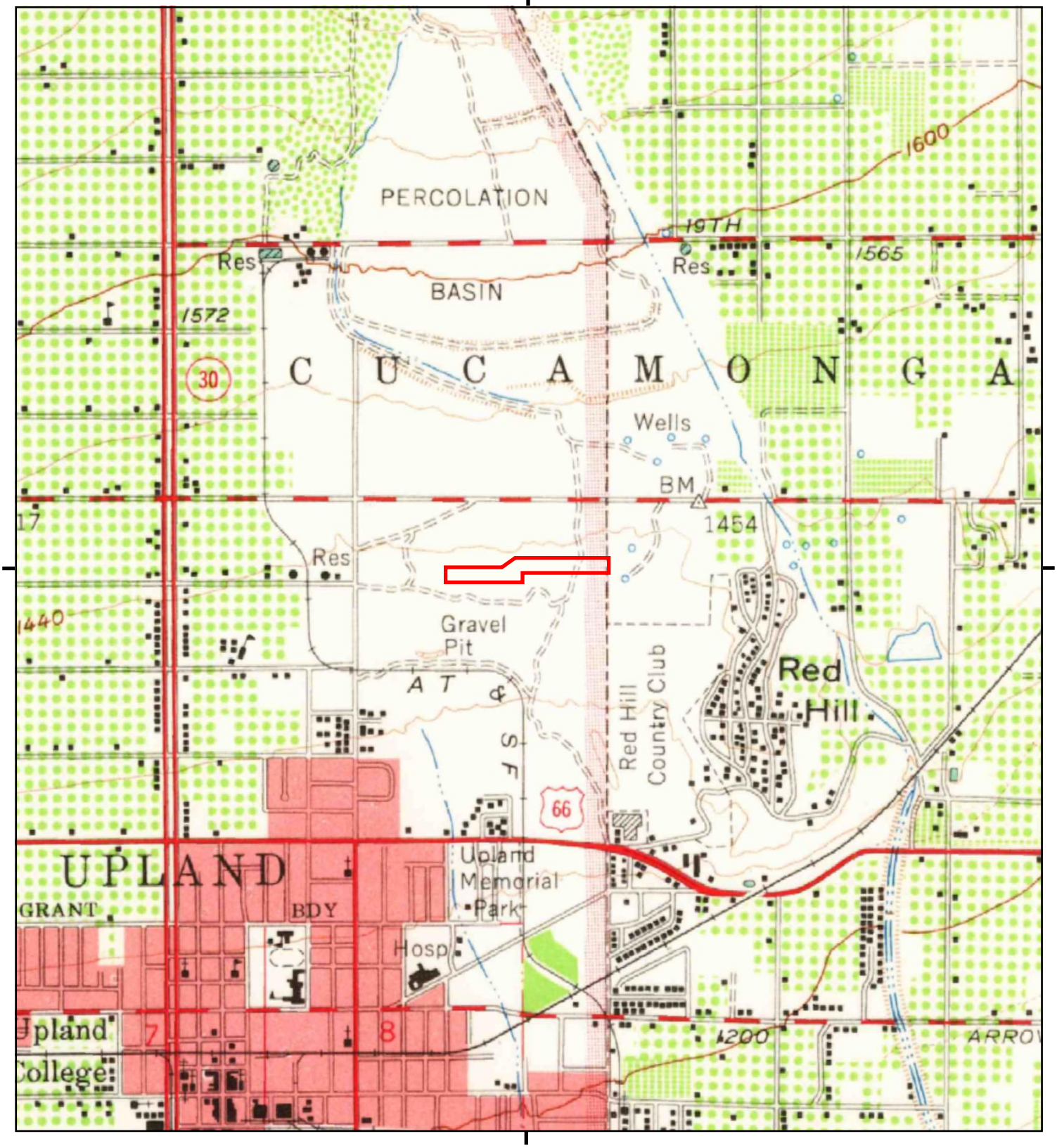
TP, Ontario, 1967, 7.5-minute
NE, Cucamonga Peak, 1966, 7.5-minute
SE, Guasti, 1966, 7.5-minute
NW, Mt. Baldy, 1967, 7.5-minute

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

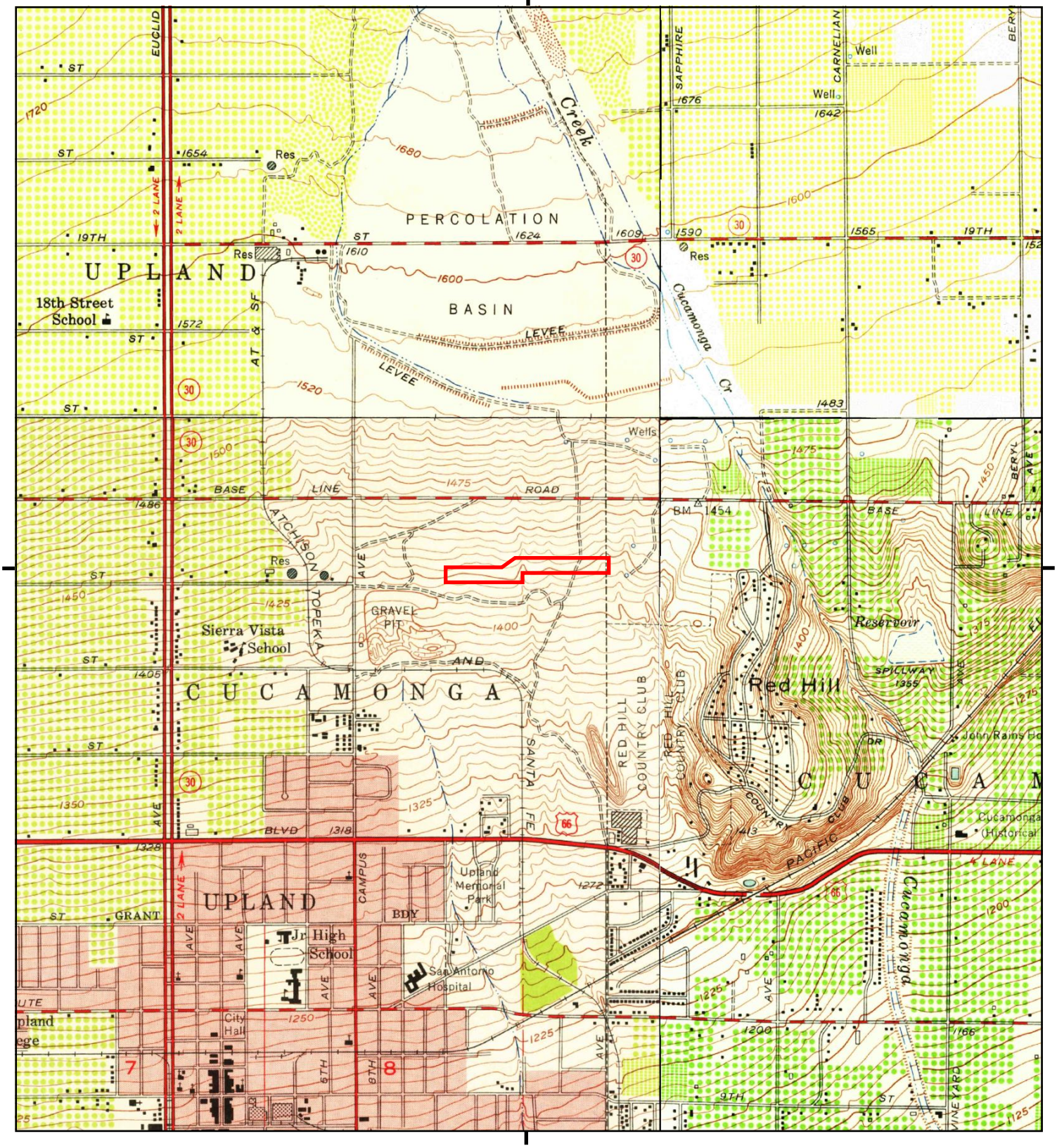
TP, Ontario, 1954, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

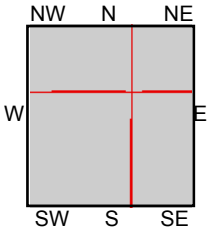
Historical Topo Map

1953, 1954



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



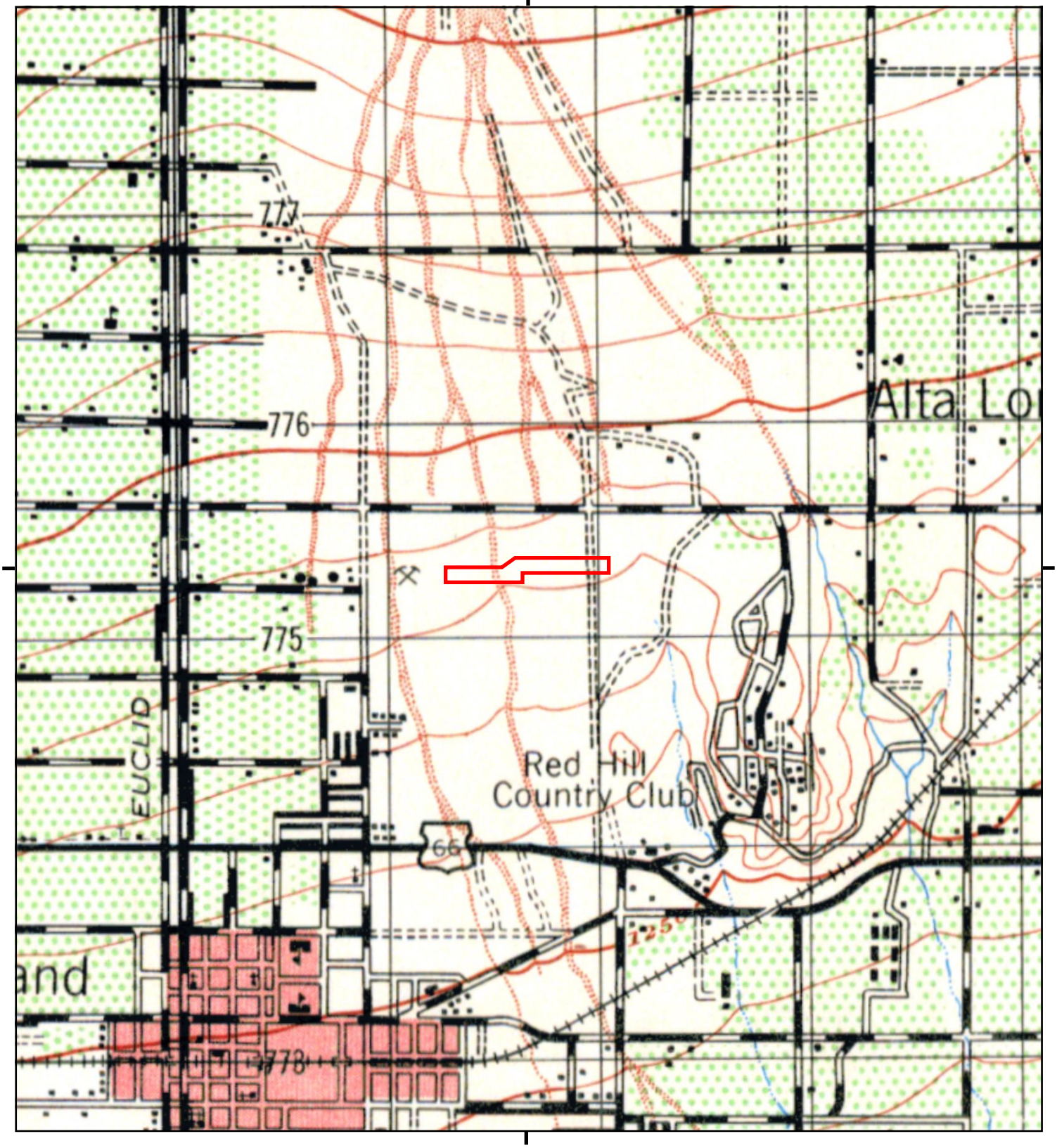
TP, Ontario, 1954, 7.5-minute
NE, Cucamonga Peak, 1953, 7.5-minute
SE, Guasti, 1953, 7.5-minute
NW, Mt. Baldy, 1954, 7.5-minute

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

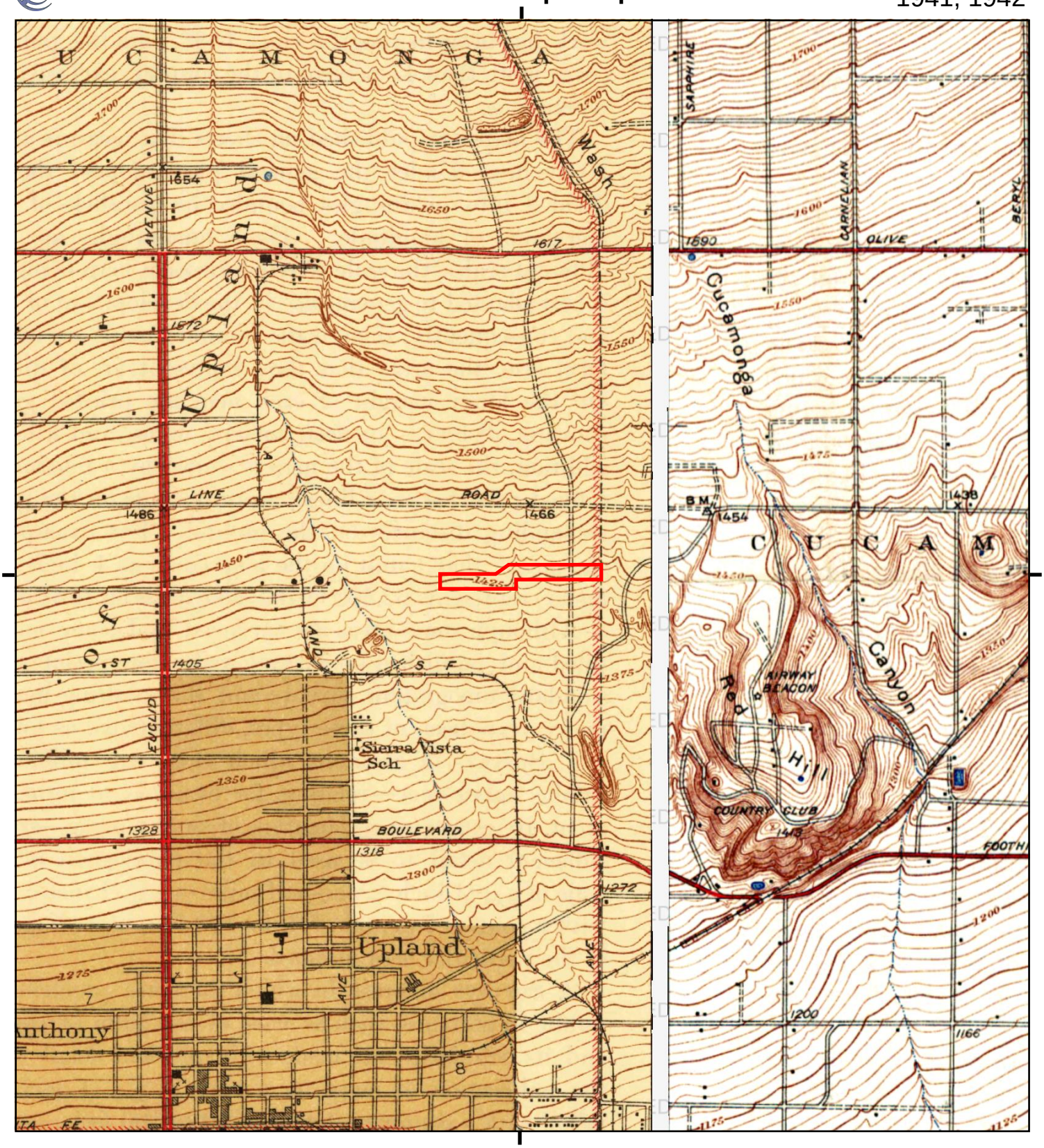
TP, CUCAMONGA, 1944, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

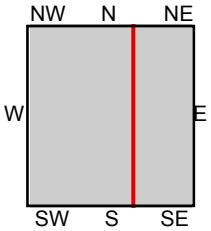
Historical Topo Map

1941, 1942



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



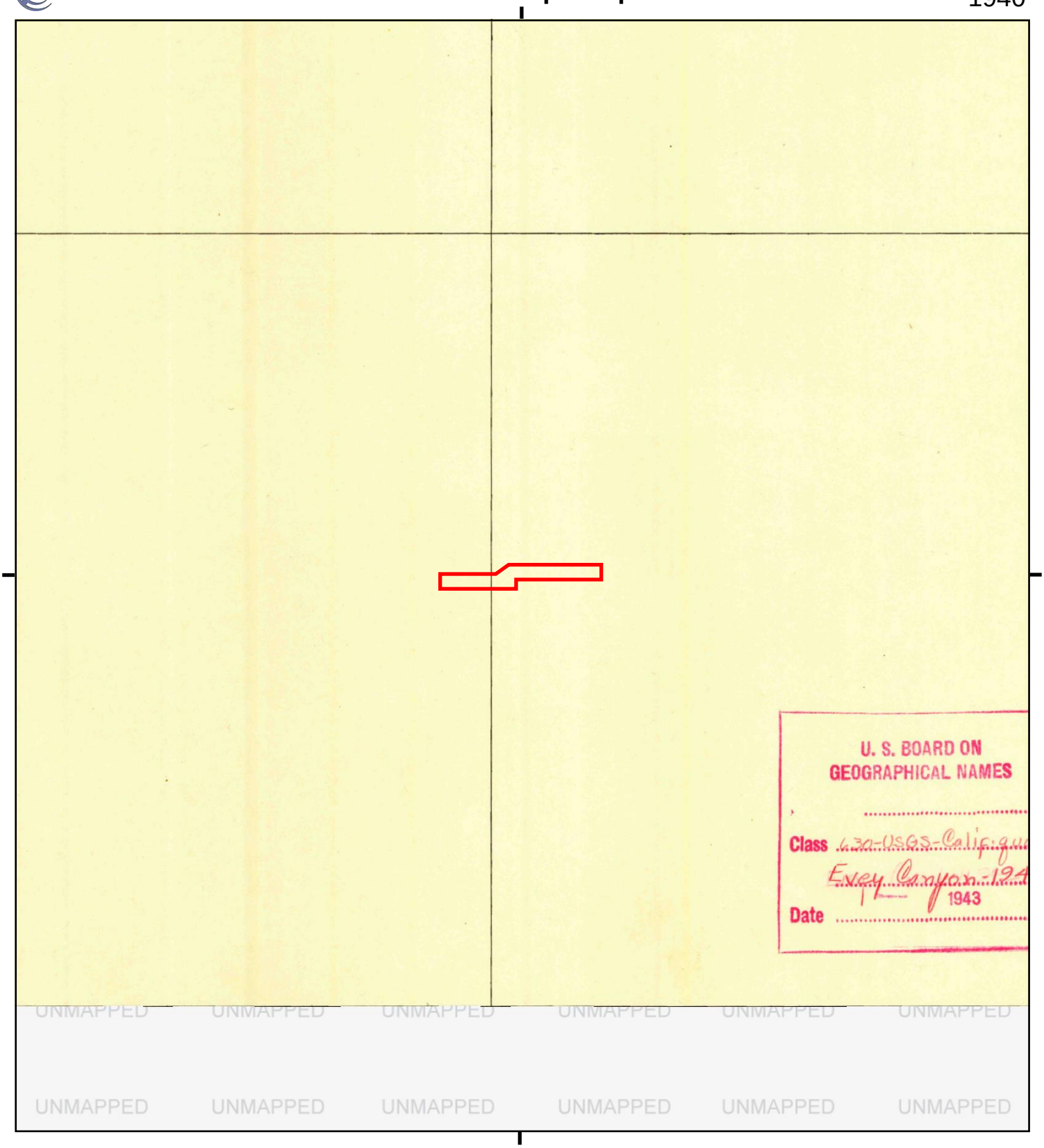
TP, Ontario and Vicinity, 1942, 7.5-minute
E, GUASTI VICINITY, 1941, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

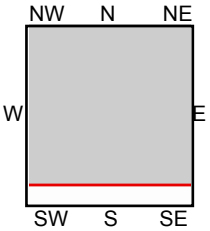
Historical Topo Map

1940



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



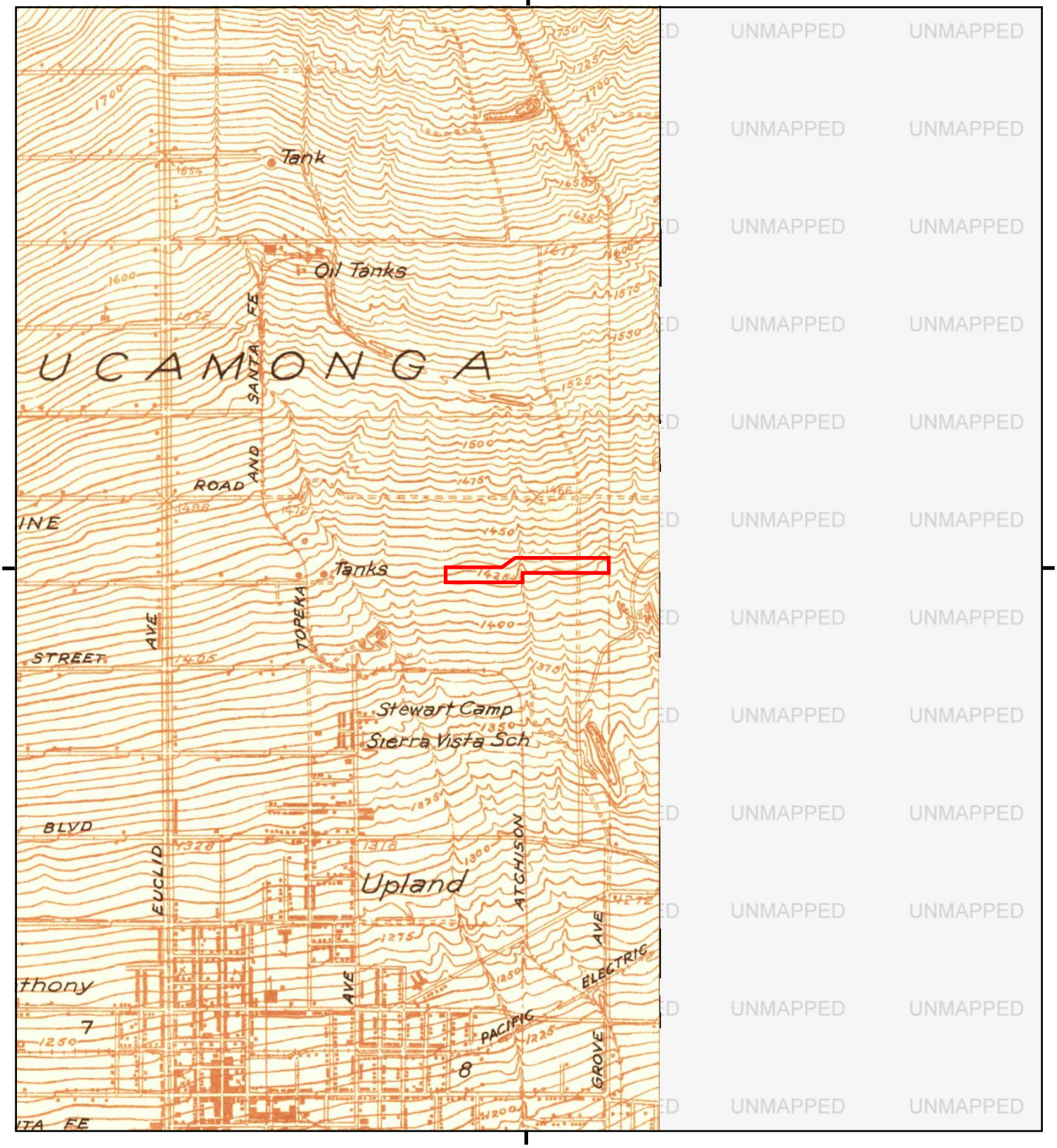
TP, Evey Canyon, 1940, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

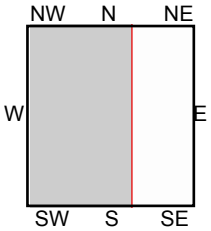
Historical Topo Map

1933



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



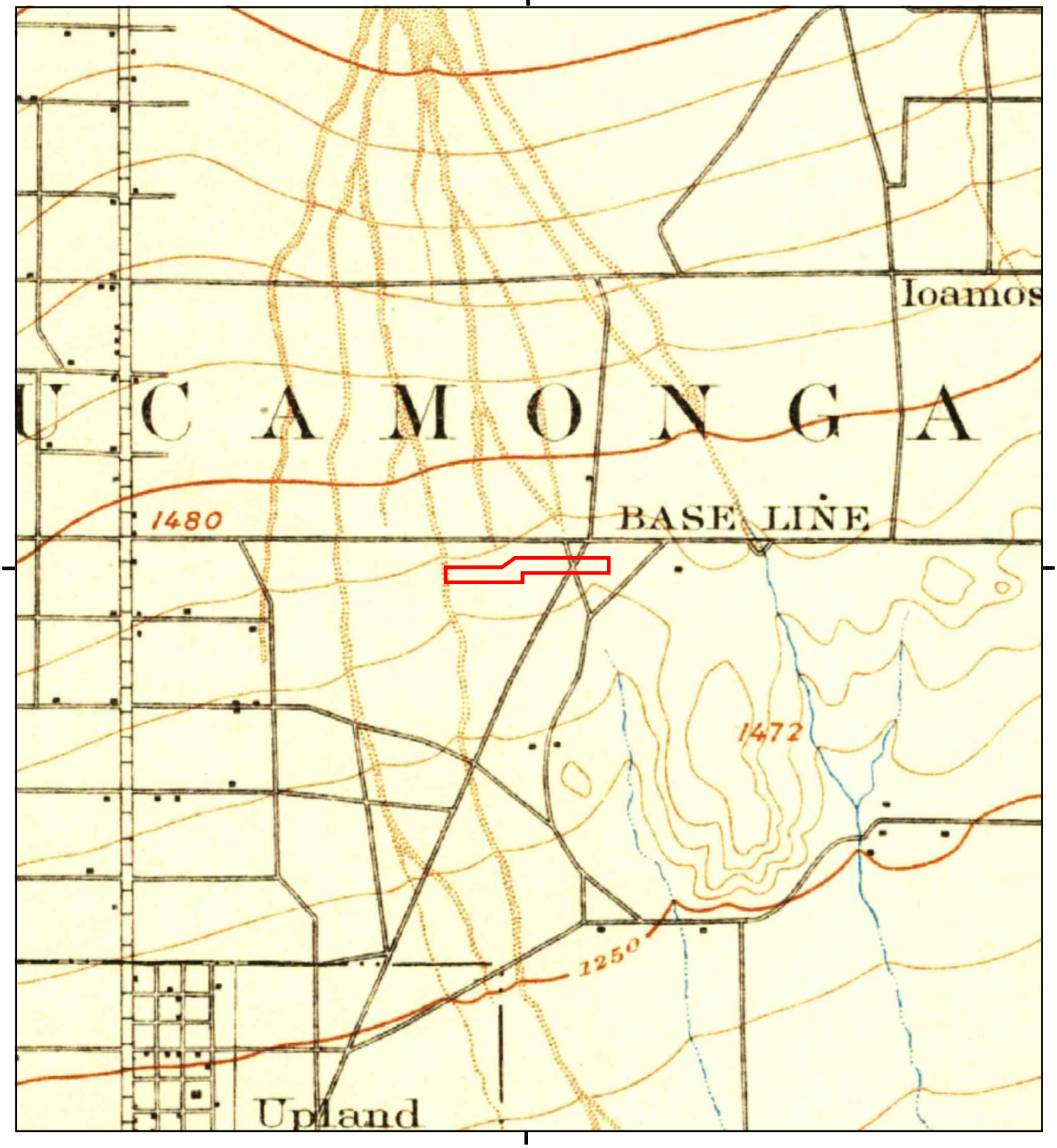
TP, Ontario, 1933, 7.5-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

Historical Topo Map

1903



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

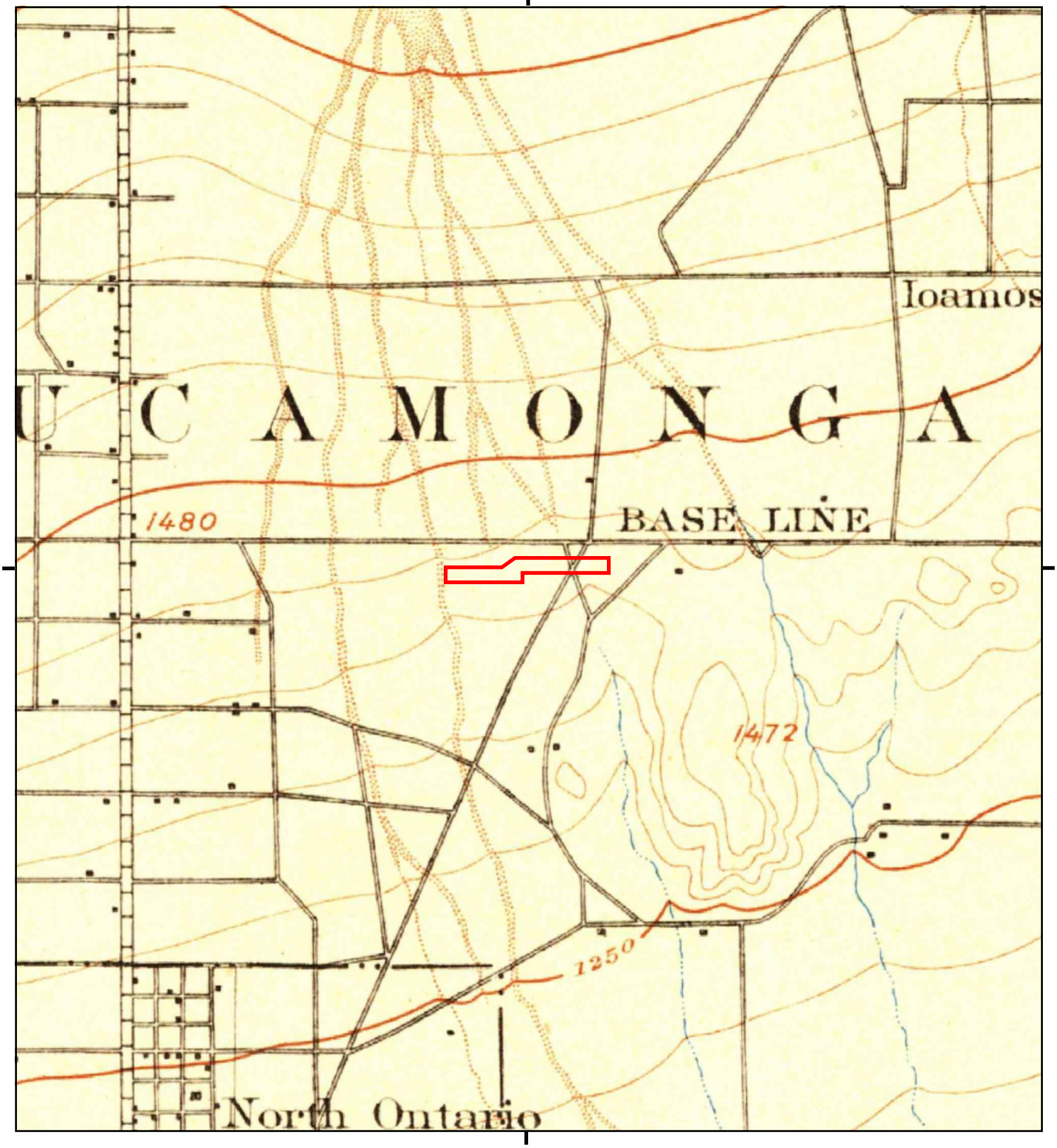
TP, Cucamonga, 1903, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

Historical Topo Map

1900



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

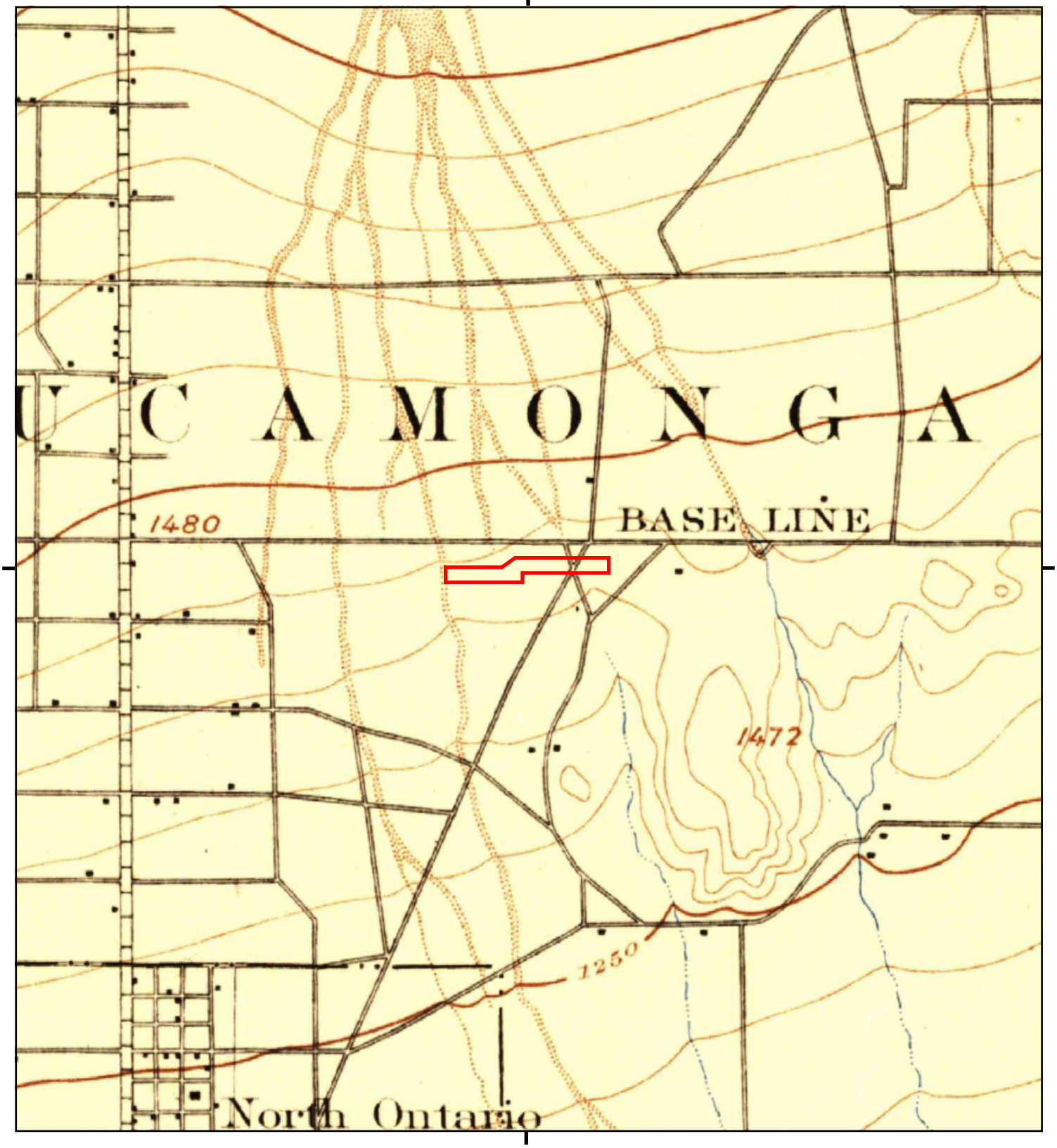
TP, Cucamonga, 1900, 15-minute

SITE NAME: Upland Site
ADDRESS: East 15th Street/North 13th Avenue
Upland, CA 91786
CLIENT: Geotek

N

Historical Topo Map

1897



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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Secondary Map	**3**
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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

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 LUST: LUST	1231 16TH ST	1/10 - 1/3 N	▲ A2	8
UPLAND HILLS COUNTRY CLUB LUST: LUST San Bern. Co. Permit: San Bern. Co. Permit 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 CIWQS: CIWQS	Not Reported	<1/10 W	◆ 1	8
UPLAND HILLS COUNTRY CLUB LUST: LUST San Bern. Co. Permit: San Bern. Co. Permit 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

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

0 300 1/3 1/2 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

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 Upland CA 91786	CONTACT: Anna M. Scott INQUIRY #: 5331724.2s
LAT/LONG: 34.118806 / 117.632694	DATE: June 14, 2018 12:49 pm

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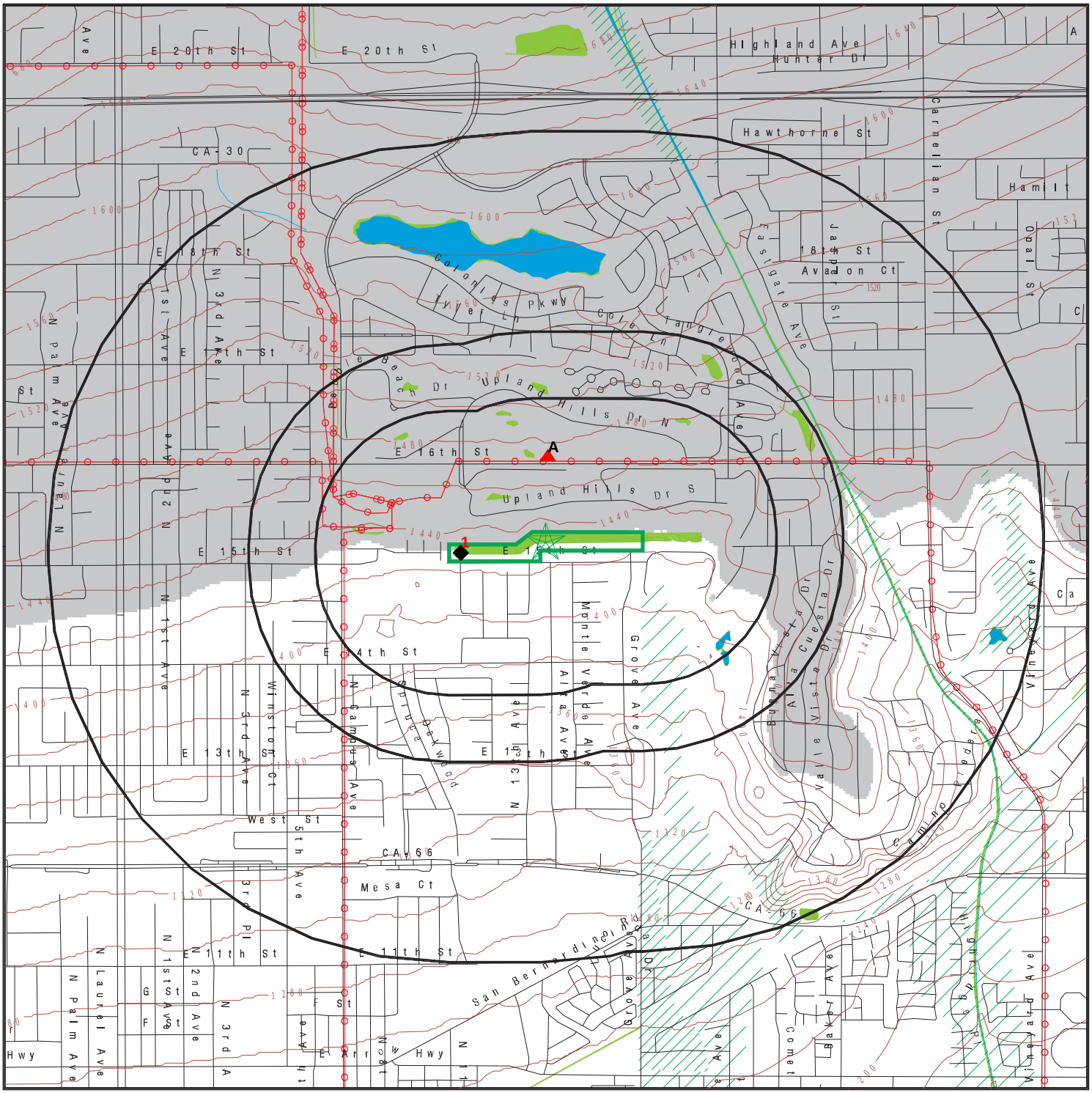
SECONDARY MAP - 5331724.2S



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

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 Upland CA 91786	CONTACT: Anna M. Scott
LAT/LONG: 34.118806 / 117.632694	INQUIRY #: 5331724.2s DATE: June 14, 2018 12:46 pm

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LEGEND

FACILITY NAME **FACILITY ADDRESS, CITY, ST, ZIP**			EDR SITE ID NUMBER
◆ **MAP ID#**	Direction Distance Range Relative Elevation	(Distance feet / miles) 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 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 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 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 Local Lists of Registered Storage Tanks Other Ascertainable Records
	42 ft. Higher Elevation	1472 ft. Above Sea Level	

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

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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 ASSESSMENT
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

		Document Numbers
Name	**CITY OF UPLAND**	9101112800000
R/I	CORPORATION	
% Int	100.0000000	
Type	BILLED OWNER	
Acquisition Date	NONE	
Document Date	01/10/1991	
Inactive Date	09/12/2017	

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

		Multi Parcel List
Event Date	09/13/2017	
Event Group/Type	INACTIVATE - SPLIT	1045121040000 NEW-SPL
Multi Parcel	Yes	1045151350000 NEW-SPL
		1045121020000 OLD-SPL
		1045151340000 OLD-SPL

		Multi Parcel List
Event Date	01/10/1991	
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	
Multi Parcel	No	

		Multi Parcel List
Event Date	03/30/1983	
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	0207482050000 TOT-CNV
		1045121020000 TOT-CNV
Multi Parcel	Yes	1045151340000 TOT-CNV

		Multi Parcel List
Event Date	03/03/1983	
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	
Multi Parcel	No	

		Multi Parcel List
Event Date	11/02/1982	
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	
Multi Parcel	No	

		Multi Parcel List
Event Date	04/17/1981	
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	
Multi Parcel	No	

		Multi Parcel List
Event Date	04/17/1981	
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	**Multi Parcel List**
Event Group/Type	TRANSFER - WORKED IN OLD SYSTEM (100% OR PARTIAL)	
Multi Parcel	No	

Ownership History

Owner Name: CITY OF UPLAND

		Document Numbers
R/I	CORPORATION	9101112800000
% Int	100.0000000	
Type	BILLED OWNER	
Acquisition Date	NONE	
Document Date	01/10/1991	
Inactive Date	09/12/2017	

Owner Name: UPLAND HILLS COUNTRY CLUB ASSOC LTD

		Document Numbers
R/I	PARTNERSHIP	8306689200000
% Int	100.0000000	
Type	BILLED OWNER	
Acquisition Date	NONE	
Document Date	03/30/1983	
Inactive Date	01/09/1991	

Owner Name: MATREYEK, HOMES INC

		Document Numbers
R/I	CORPORATION	8221857600000
% Int	100.0000000	
Type	BILLED OWNER	
Acquisition Date	NONE	
Document Date	11/02/1982	
Inactive Date	03/29/1983	

Owner Name: UPLAND HILLS COUNTRY CLUB (ERROR)

		Document Numbers
R/I	SOLE OWNER	8108339200000
% Int	100.0000000	
Type	BILLED OWNER	
Acquisition Date	NONE	
Document Date	04/17/1981	
Inactive Date	11/01/1982	

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

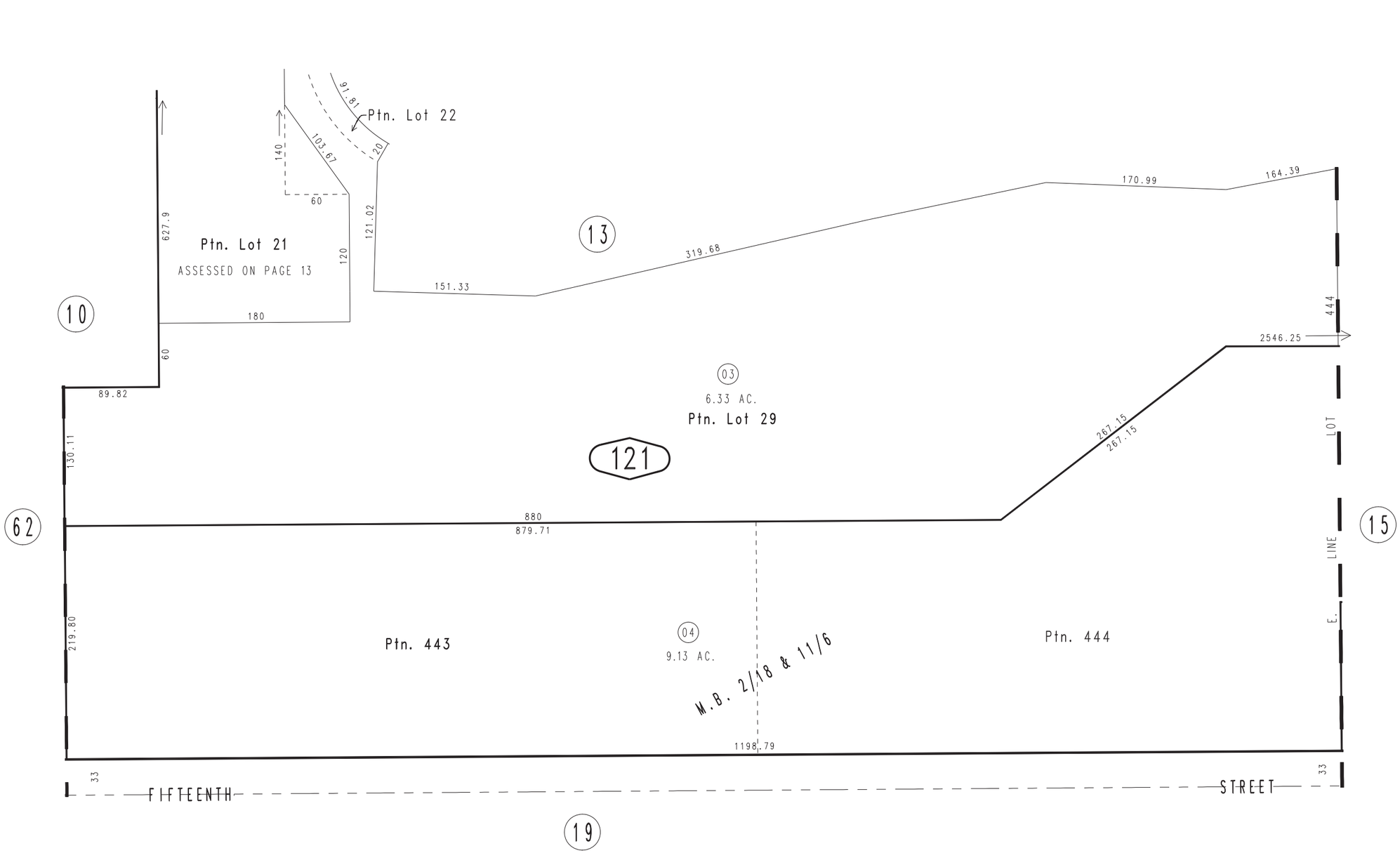
TRA	8006	**Land Value**	74,400
Supplement	NO	**Improvement Value**	0
Correction Date		**Improvement Penalty**	0
Correction Code		**Pers Prop Value**	0
Original Parcel	1045151340000	**Pers Prop Penalty**	0
Billed Owner		**Total Penalties**	0
Joint Owner		**Total Value**	74,400
		HOX Exemptions	0
		Special 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



REVISED
11/29/17 KA

August 2004

Ptn. Ontario Colony Lands, M.B. 2/8 & 11/6

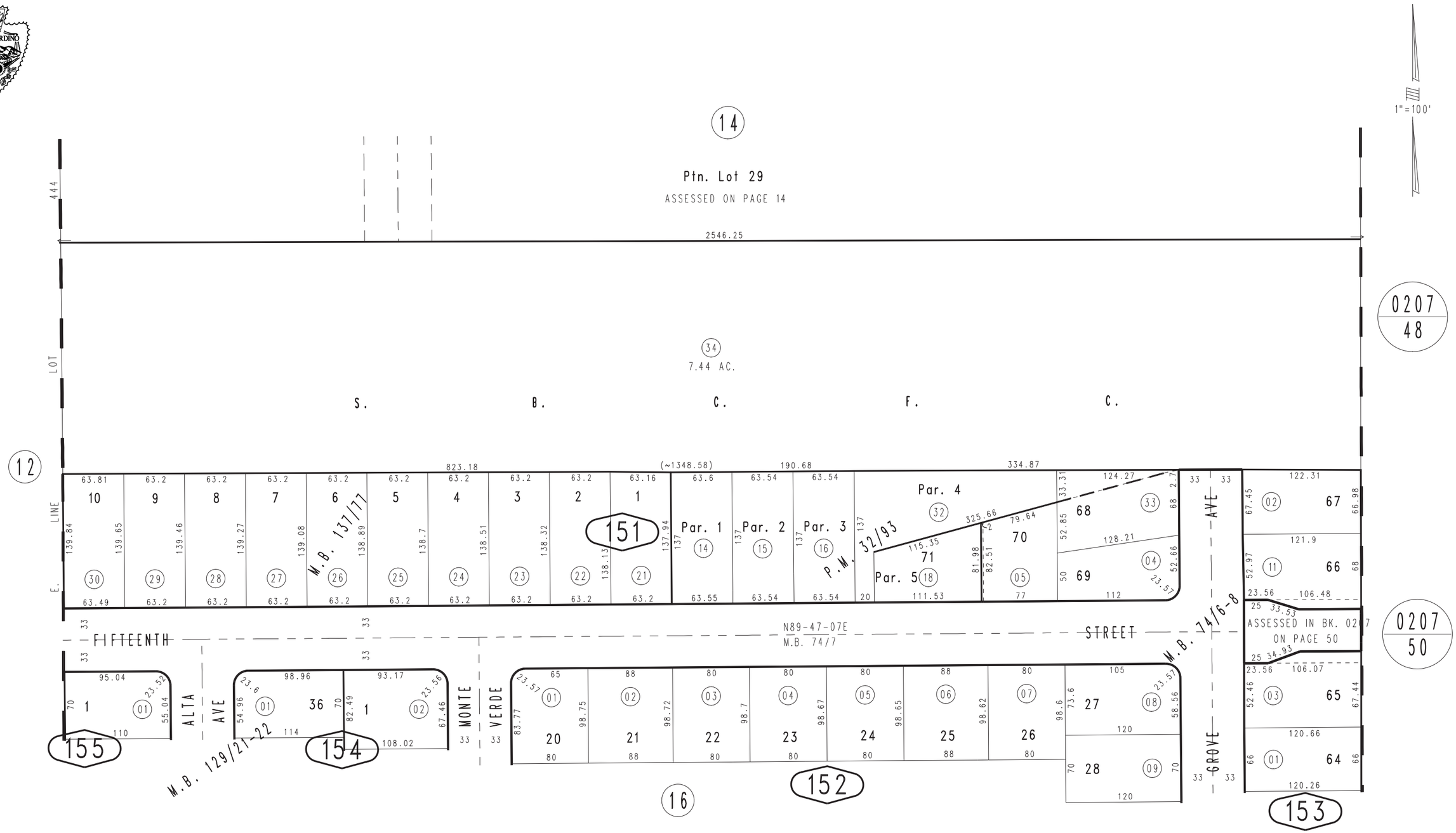
Ptn. N.E.1/4, Sec.5
T.1S.,R.7W., S.B.B.&M.

Assessor's Map
Book 1045 Page 12
San Bernardino County

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



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

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

August 2004

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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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

National Clandestine Laboratory Register - California

COUNTY	CITY	ADDRESS	DATE
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

National Clandestine Laboratory Register - California

COUNTY	CITY	ADDRESS	DATE
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

National Clandestine Laboratory Register - California

COUNTY	CITY	ADDRESS	DATE
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

National Clandestine Laboratory Register - California

COUNTY	CITY	ADDRESS	DATE
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.

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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.

GEOTEK

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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GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
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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

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

EXECUTIVE SUMMARY

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

EXECUTIVE SUMMARY

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				

EXECUTIVE SUMMARY

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 Database: AST, Date of Government Version: 07/06/2016	1231 E. 16TH ST	N 1/8 - 1/4 (0.186 mi.)	A8	13

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 Status: A Tank Status: A Comp Number: 57116	***1231 E 016TH ST***	***N 1/8 - 1/4 (0.186 mi.)***	***A5***	***9***

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 Facility Id: 36009162 Status: A	***1231 E 016TH ST***	***N 1/8 - 1/4 (0.186 mi.)***	***A5***	***9***

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 Facility Status: ACTIVE Facility Id: FA0006955	***1231 E 16TH ST***	***N 1/8 - 1/4 (0.186 mi.)***	***A7***	***11***

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.

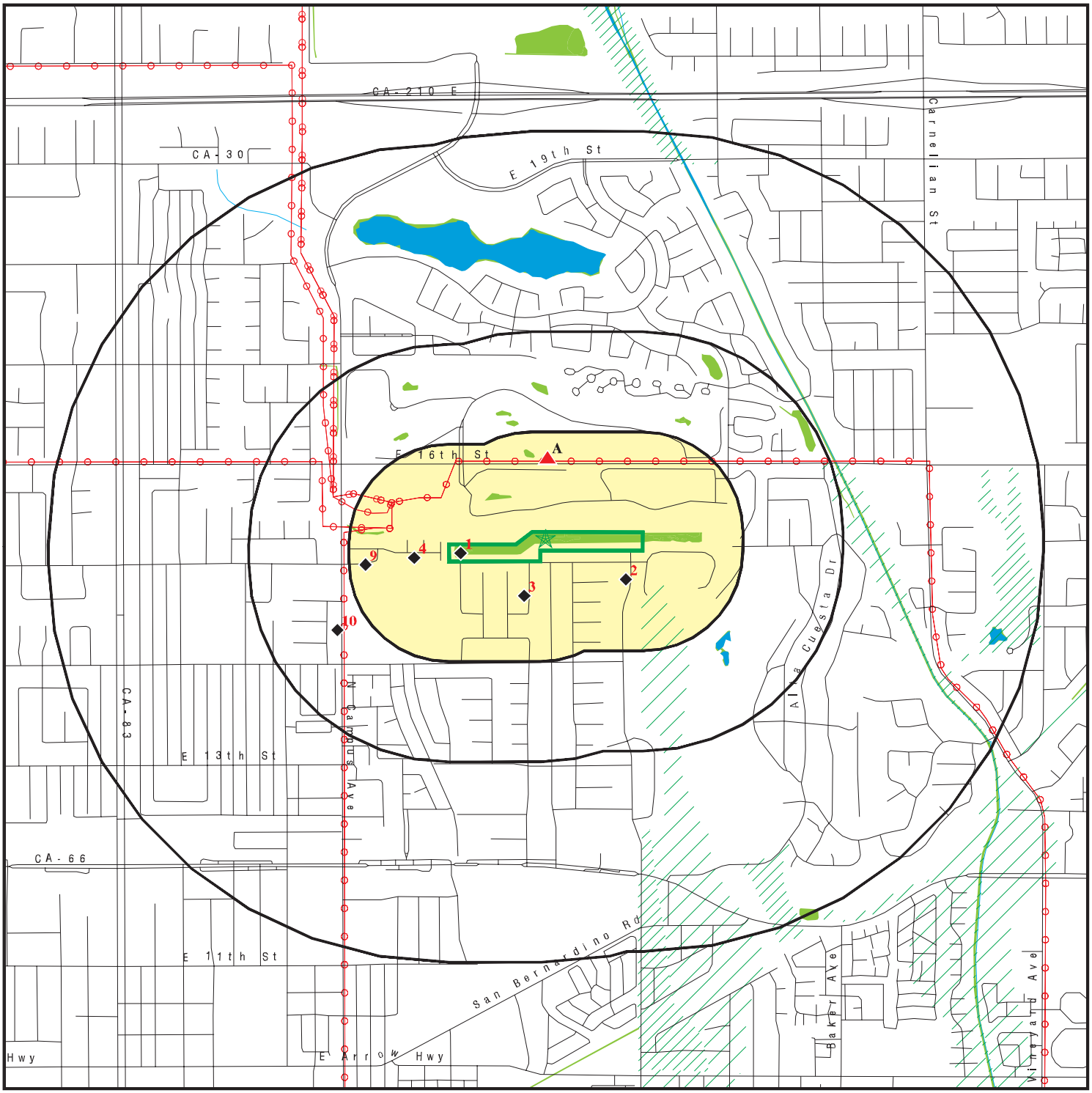
Lower Elevation	Address	Direction / Distance	Map ID	Page
PREMIER DRY CLEANING	1469 N 13TH AVE	SSW 0 - 1/8 (0.086 mi.)	3	8

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

0 1/4 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 Upland CA 91786	CONTACT: Anna M. Scott INQUIRY #: 5331724.2s
LAT/LONG: 34.118806 / 117.632694	DATE: June 14, 2018 12:48 pm

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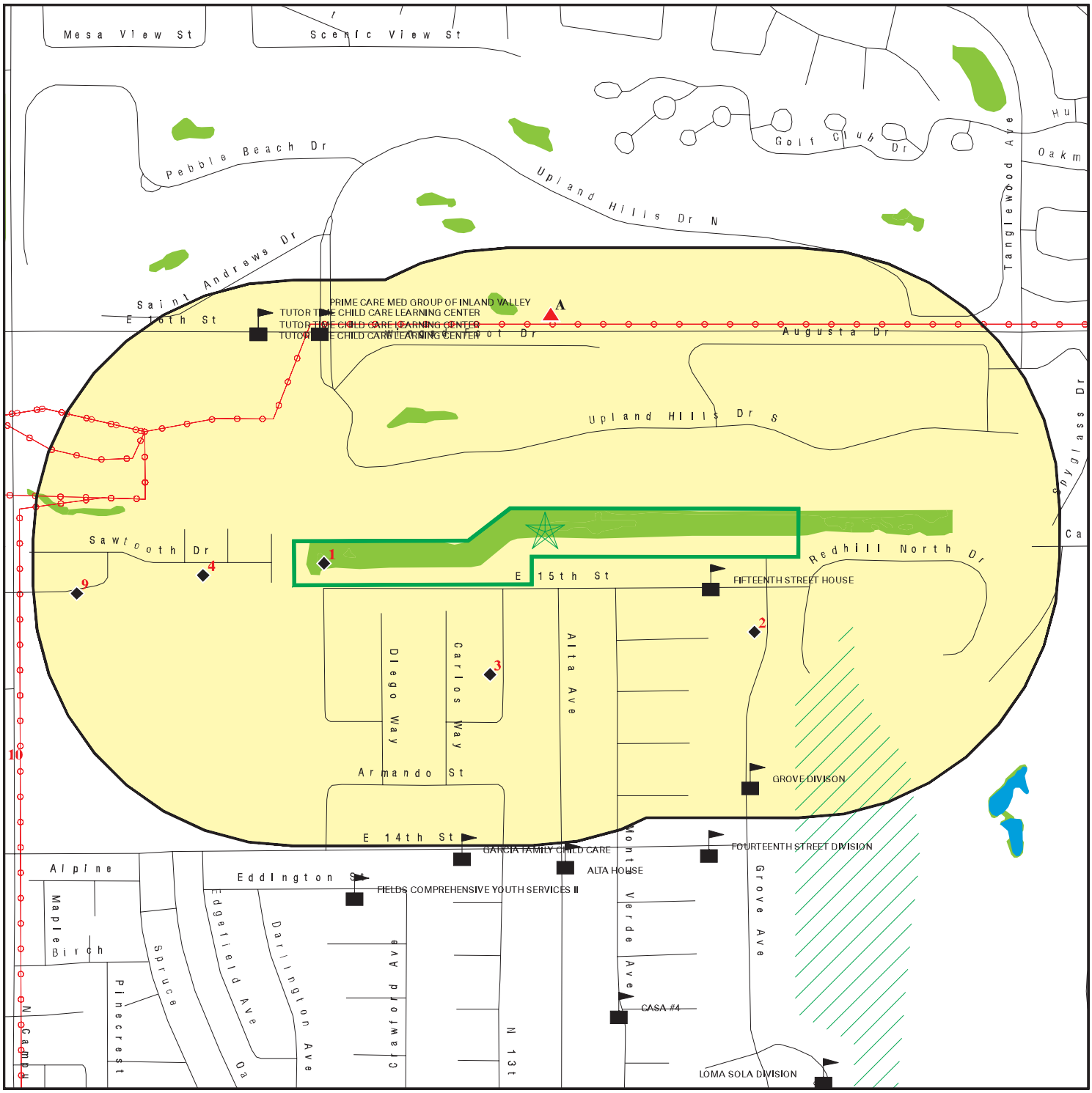
DETAIL MAP - 5331724.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

0 1/8 1/4 1/2 Miles

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 Upland CA 91786	CONTACT: Anna M. Scott 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
1 ft.

UPLAND, CA 91786

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

A5
North
1/8-1/4
0.186 mi.
984 ft.

UPLAND HILLS COUNTRY CLUB
1231 E 016TH ST
UPLAND, CA 91786

SWEEPS UST
CA FID UST

S101619086
N/A

Site 1 of 4 in cluster 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

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:
Higher

Actual:
1472 ft.

LUST REG 8:

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

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

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.

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	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: N/A
Date Made Active in Reports: 01/05/2018	Last EDR Contact: 05/30/2018
Number of Days to Update: 14	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	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/05/2017	Telephone: 703-603-8704
Date Made Active in Reports: 04/07/2017	Last EDR Contact: 04/06/2018
Number of Days to Update: 92	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	Source: EPA
Date Data Arrived at EDR: 02/06/2018	Telephone: 800-424-9346
Date Made Active in Reports: 04/13/2018	Last EDR Contact: 05/30/2018
Number of Days to Update: 66	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

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

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:

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

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.

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).

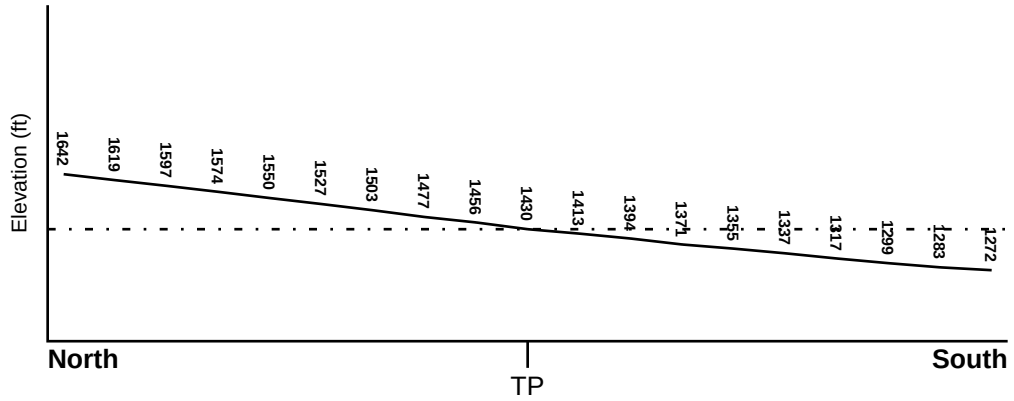
TOPOGRAPHIC INFORMATION

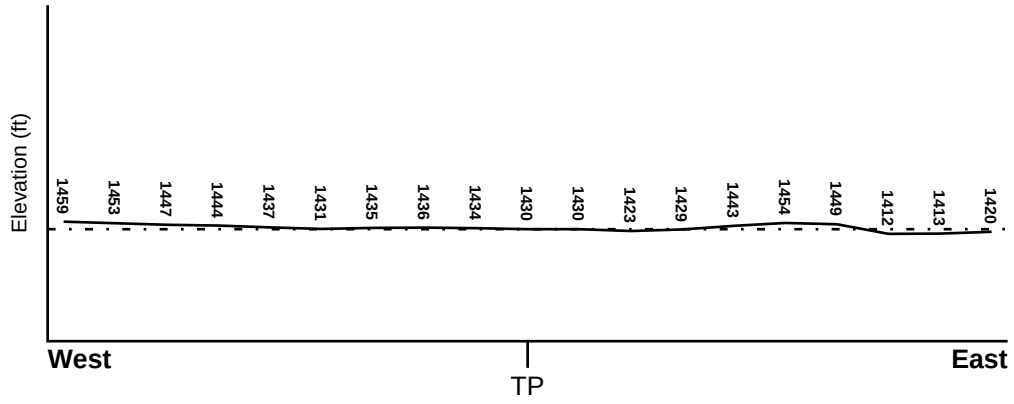
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 1430 ft.

0 1/2 1 Miles

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

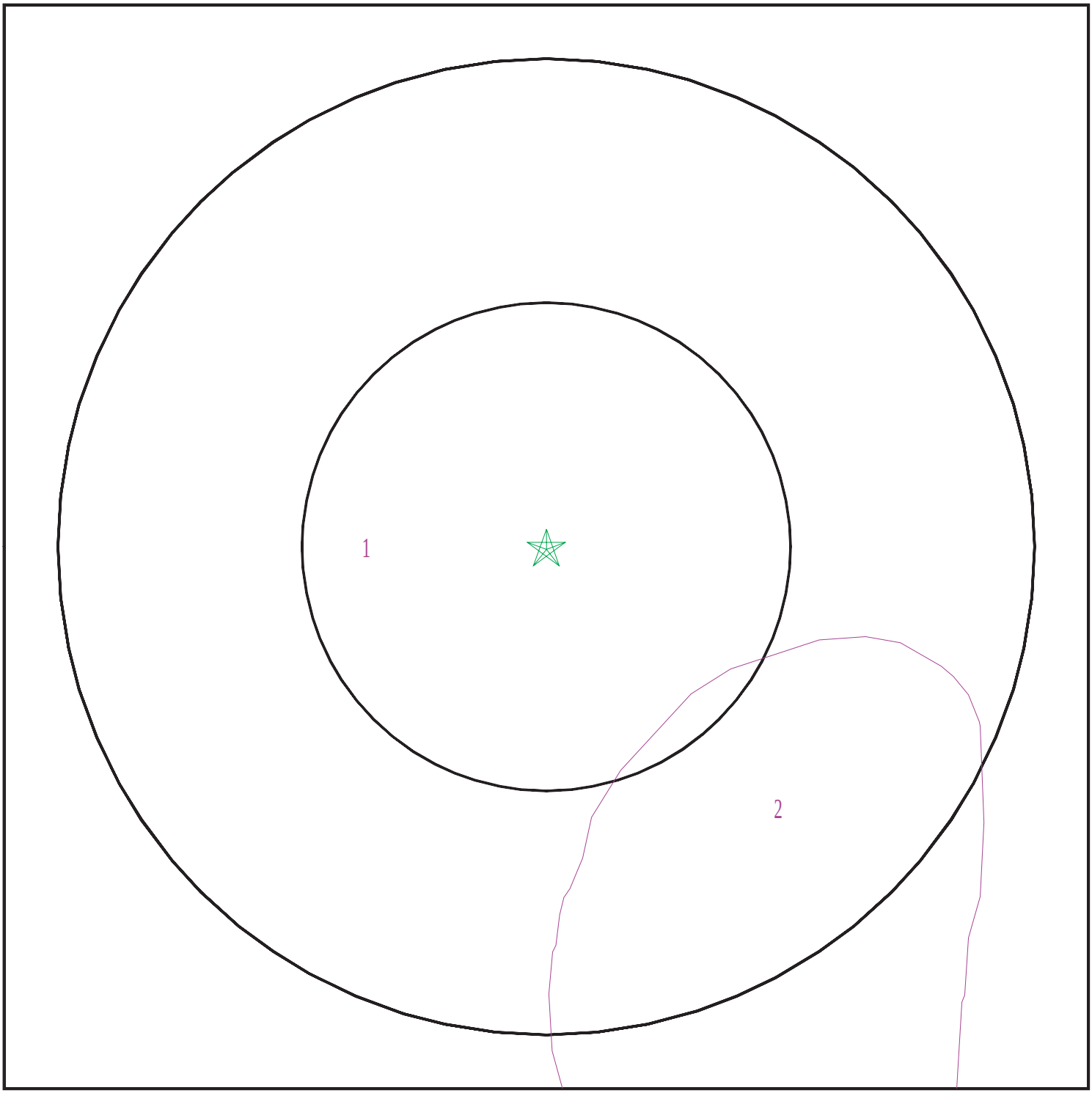
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

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



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Upland Site	CLIENT:	Geotek
ADDRESS:	East 15th Street/North 13th Avenue Upland CA 91786	CONTACT:	Anna M. Scott
		INQUIRY #:	5331724.2s
LAT/LONG:	34.118806 / 117.632694	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

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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 Min: 42	Max: 6.5 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 Min: 42	Max: 6.5 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 Min: 141	Max: 7.3 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 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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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)		

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)		

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)		

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)		

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)		

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)		

3
ESE **CA WELLS** **CADW60000003880**
1/4 - 1/2 Mile
Lower

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		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

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)		

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		

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)		

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)		

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.		

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)		

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)		

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)		

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)		

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)		

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)		

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)		

6
ENE
1/2 - 1 Mile
Higher

AQUIFLOW **37841**

Site ID:	083601603T
Groundwater Flow:	SSE
Shallow Water Depth:	355
Deep Water Depth:	376
Average Water Depth:	Not Reported
Date:	10/1990

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

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		

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		

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

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

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		

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

D14
East **CA WELLS** **1064**
1/2 - 1 Mile
Lower

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		
	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		

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

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

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		

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		

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		

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)		

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)		

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		

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)		

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		

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)		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

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		

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		

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)		

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)		

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		

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)		

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		

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)		

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

AQUIFLOW **37841**

Site ID:	083601603T
Groundwater Flow:	SSE
Shallow Water Depth:	355
Deep Water Depth:	376
Average Water Depth:	Not Reported
Date:	10/1990

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.

GEOTEK

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

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.

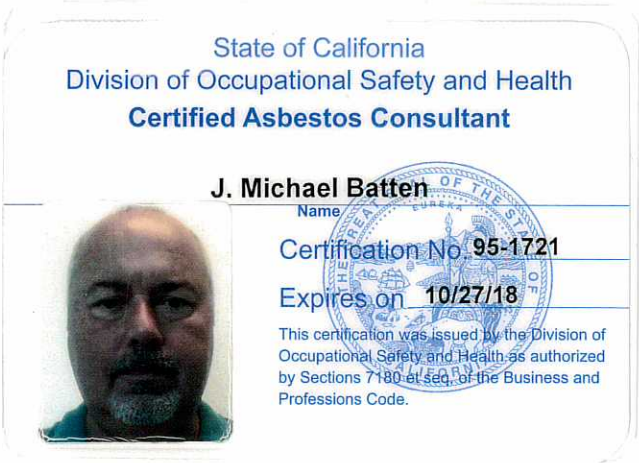
Please contact our office at the above address, fax number or email; of any changes in your contact/mailing information within 15 days of the change.

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 — 12/12/09
(Trainer) (Date)

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

REGISTERED PROFESSIONAL ENGINEER
SCOTT P. GILBERT
RE NO. 65194
CIVIL
STATE OF CALIFORNIA

10/08/2019

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Appendix A: Developed Hydrology Map

Appendix B: NOAA Atlas 14 Rainfall Data
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Appendix C: **Rational Method Calculations**
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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

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.

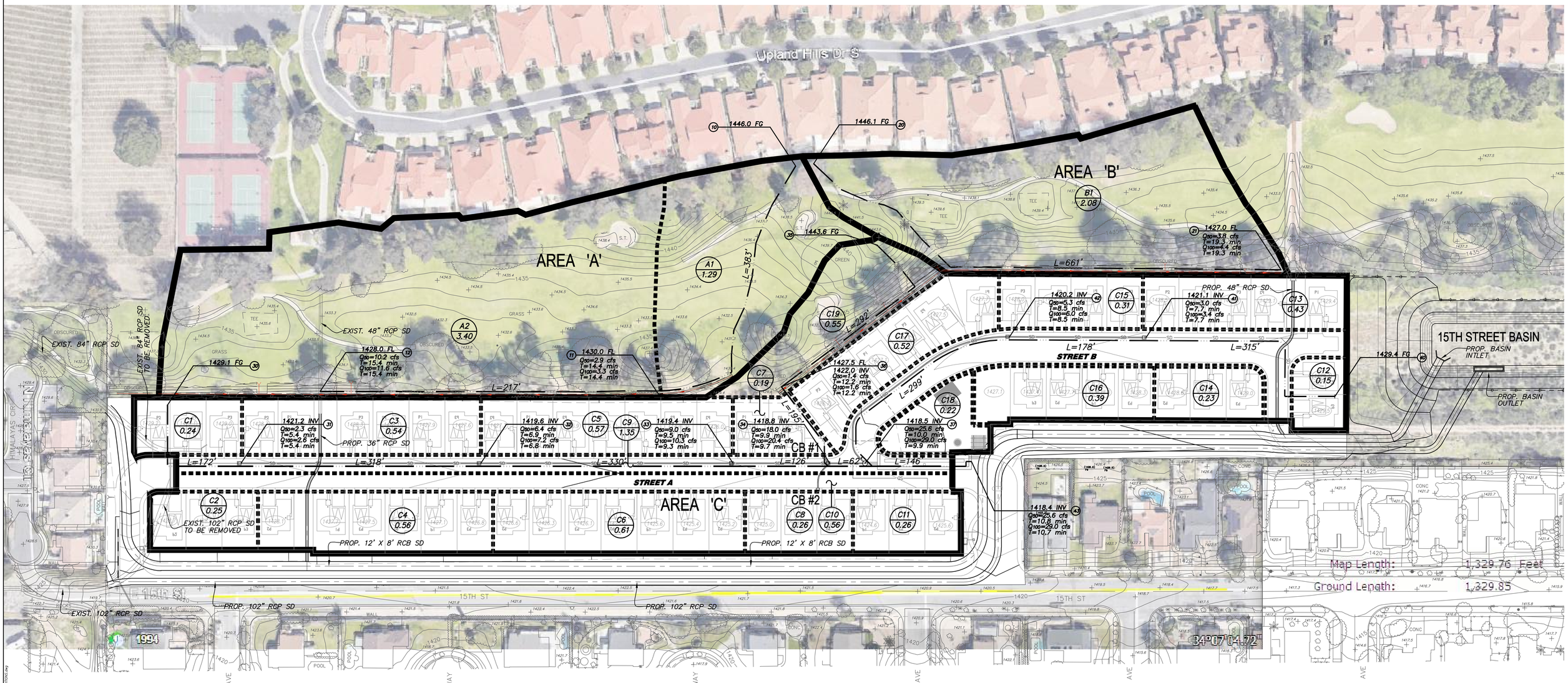
PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

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



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 — DRAINAGE AREA DESIGNATION	
1.21 — AREA IN ACRES	
12 — NODE NUMBER	
335.40 FS — FINISHED SURFACE ELEVATION	
327.50 INV — INVERT ELEVATION	
Q_{50}=1.6 cfs — FLOW RATE OF 50 YEAR STORM (cfs)	
Q_{100}=1.6 cfs — FLOW RATE OF 100 YEAR STORM (cfs)	
T=9.8 min — TIME IN CONCENTRATION, Tc (min)	

PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
PROACTIVE INFRASTRUCTURE CONSULTANTS
200 SOUTH MAIN STREET, SUITE 100 Corona, CA 92881
951-268-5300

50' 25' 0' 50'
SCALE: 1" = 50'

DEVELOPED HYDROLOGY MAP

EXHIBIT A
TRACT NO. 20245
CITY OF UPLAND

6/13/2019

DEVELOPED HYDROLOGY

APPENDIX B

NOAA ATLAS 14 RAINFALL DATA

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth **Units:** English **Time series type:** Partial duration

Select location

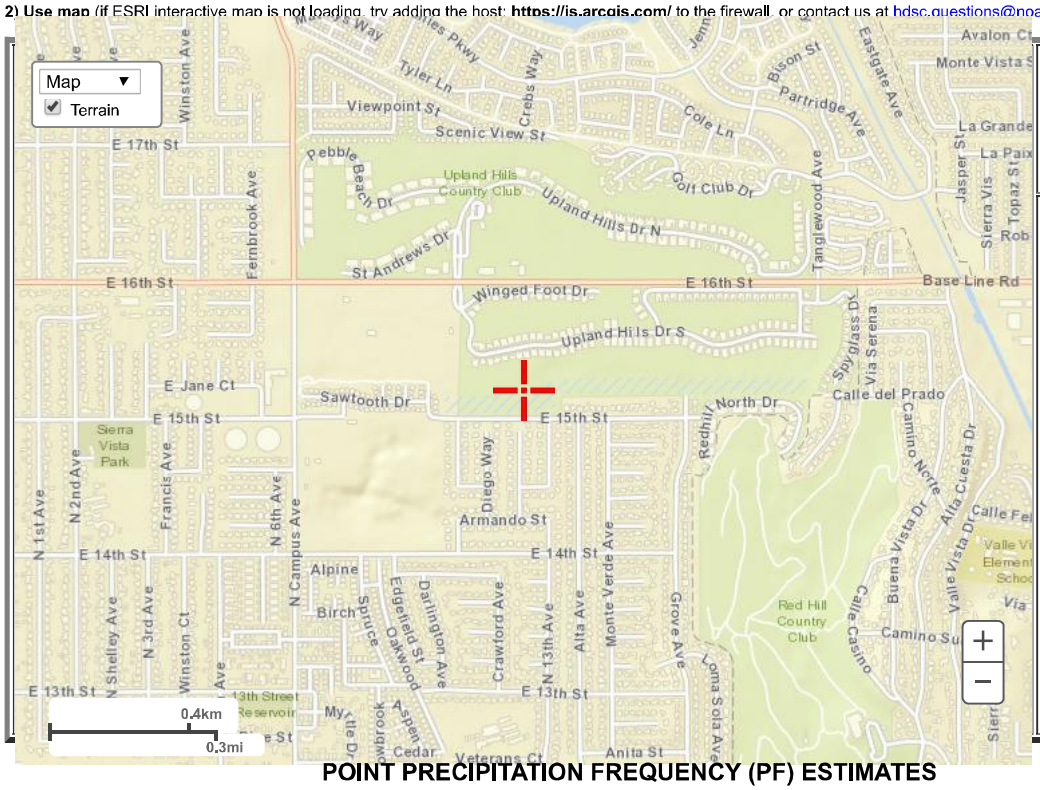
1) Manually:

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,

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

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National Oceanic and Atmospheric Administration
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1325 East West Highway
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Page Author: HDSC webmaster
Page last modified: April 21, 2017

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HYDROLOGIC SOILS GROUP MAP

Hydrologic Soil Group—San Bernardino County Southwestern Part, California

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

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

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)
```

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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 =     6.88 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.)
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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.)
```

```
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.)


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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

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 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 = 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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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


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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)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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.)
```

```
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  =    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.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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
```

```
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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 =      1.539(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)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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

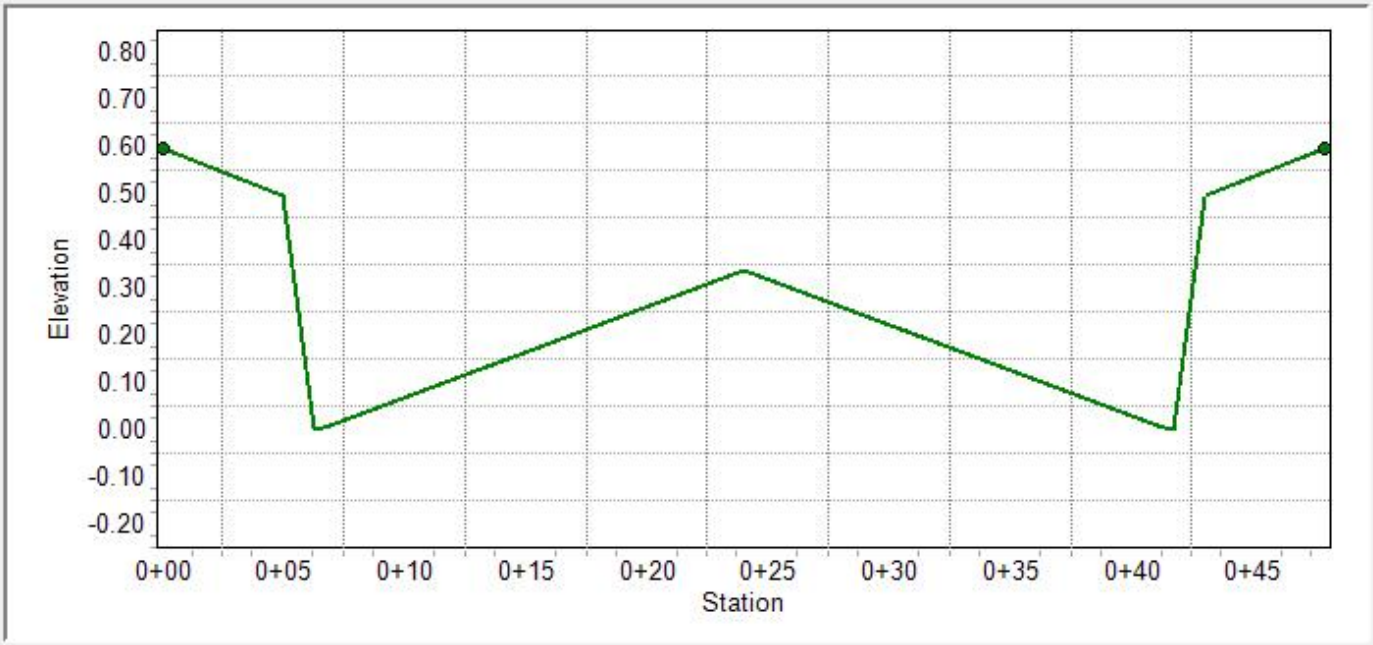
Insert | Delete

	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
*			



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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

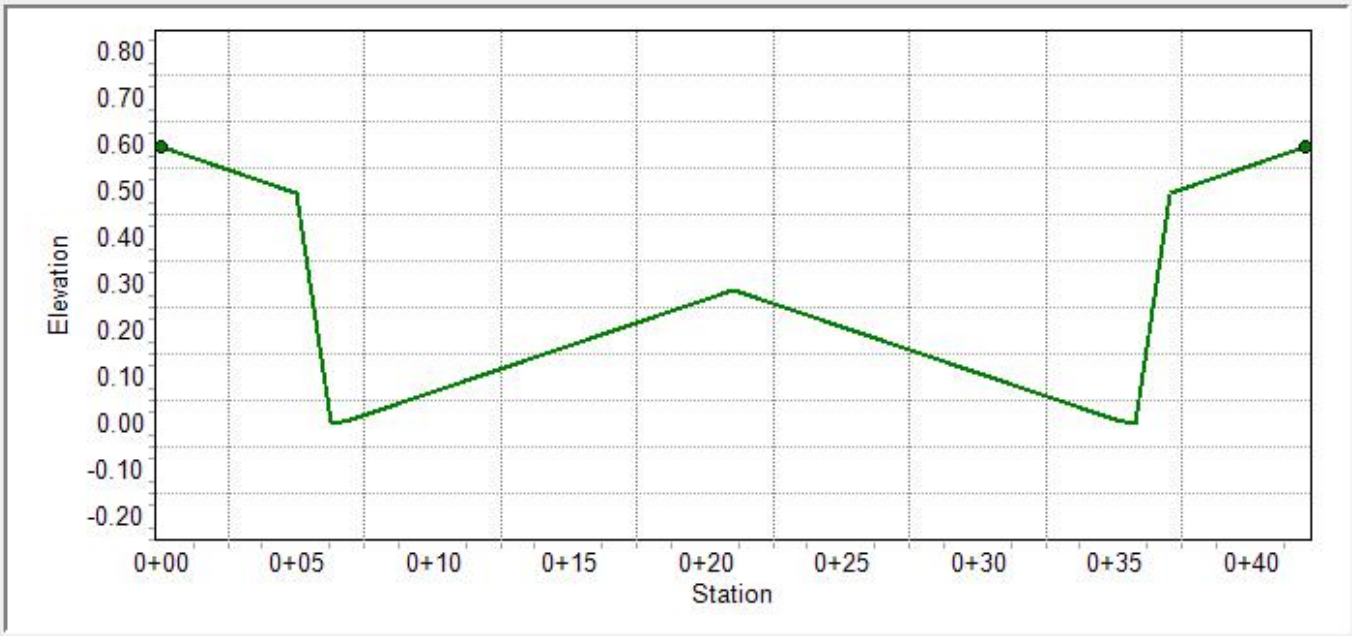
Insert | Delete

	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
*			



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Preliminary
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: 10/18/19

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	Project Manager		
Company	Frontier Communities		
Address	2151 Convention Center Way Suite 114, Ontario, CA 91764		
Email	tnguyen@frontier-enterprises.com		
Telephone #	909-354-8040		
Signature		Date	10-12-19

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."

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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		PE Stamp Below
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	

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RAINFALL DATA

APPENDIX B

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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. 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 ft^2 or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft^2 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 ft^2 or more
☐ Hillside developments of 5,000 ft^2 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 ft^2 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 ft^2 or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft^2 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 ☐ Vertical density [20%] ☒ 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. Water Quality Credits will only be applied if total LID DCV cannot be met with on-site BMP's. Use of water quality credits will be determined during final engineering.		

Section 3 Site and Watershed Description

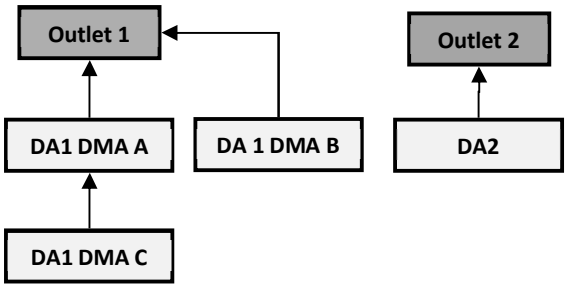
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and 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 *Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/* *See 'Drainage Facilities" link at this website*	Santa Ana Reach 3 (Prado Basin) Cucamonga Creek
Applicable TMDLs *Refer to Local Implementation Plan*	TBD by City
303(d) listed impairments *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 **Santa Ana Reach 3**: Lead
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	None
Unlined Downstream Water Bodies *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* ☒ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ 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 *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 ☐ Explanation: The project will include landscape areas and open spaces to optimize pervious surfaces.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: Roof drains will drain to pervious areas where possible to maximize infiltration.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: The site will preserve existing drainage patterns.
Disconnect impervious areas: Yes ☒ No ☐ 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 ☒ Explanation: There is no existing vegetation on site.
Re-vegetate disturbed areas: Yes ☐ No ☒ Explanation: Not Applicable
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ 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 ☒ 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 ☐ 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 mi²), 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 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
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 *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 ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 737 *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 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 *$R_c = 0.858(Imp\%)^3 - 0.78(Imp\%)^2 + 0.774(Imp\%) + 0.04$*
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 *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 ☐ 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 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
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 *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 ☐ 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 *Form 4.2-3 Item 12*	**2** N/A *Form 4.2-4 Item 13*	**3** N/A *Form 4.2-5 Item 10*
Post-developed	**4** N/A *Form 4.2-3 Item 13*	**5** N/A *Form 4.2-4 Item 14*	**6** N/A *Form 4.2-5 Item 14*
Difference	**7** *N/A* *Item 4 – Item 1*	**8** *N/A* *Item 2 – Item 5*	**9** *N/A* *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** *N/A%* *Item 7 / Item 1*	**11** *N/A%* *Item 8 / Item 2*	**12** *N/A%* *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 *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) *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 *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) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *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) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *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: *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: *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: *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: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *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 ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA 2 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): N/A *$V_{retention}$ =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 2 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 barrels/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA 2 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 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 ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA 3 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): N/A *$V_{retention}$ =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 3 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 barrels/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA 3 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*			

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).

.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 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} (ft^2) *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 (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	N/A		
15 Underground Retention Volume (ft^3) *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.

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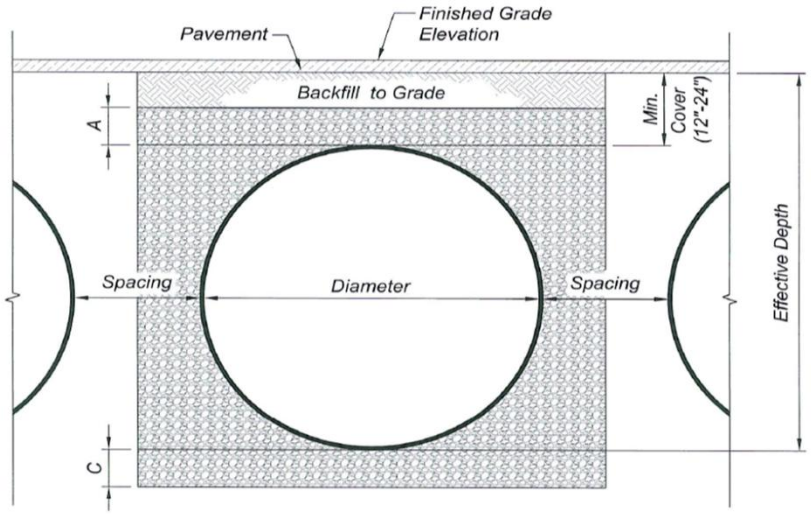
Project Summary

Date:	9/20/2018	
Project Name:	UPLAND PROJECT	
City / County:	Upland - SB County	
State:	CA	
Designed By:	Proactive Engineering	
Company:	Proactive Engineering	**Enter Information in Blue Cells**
Telephone:	951-280-3300	

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	28.27 ft^2 Pipe Area
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	



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

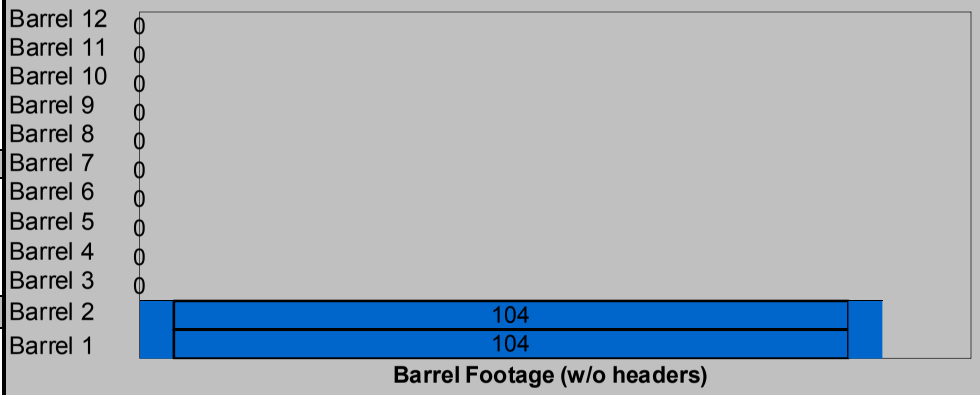
Total CMP Footage:	240	ft
Approximate Total Pieces:	12	pcs
Approximate Coupling Bands:	12	bands
Approximate Truckloads:	6	trucks

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 ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☒ 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: • 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 *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 BMP Type N/A		DA N/A DMA N/A BMP Type N/A *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *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) $A_{surface}$ *=(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* 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) $V_{biotreated}$ *= (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 *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-8 Flow Based Biotreatment (DA N/A)			
Biotreatment BMP Type *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 *(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 TGD Table 5-5*	N/A	N/A	N/A
2 Flow depth for water quality treatment (ft) *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) *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) *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) *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) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*	N/A	N/A	N/A
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*	N/A	N/A	N/A
9 Hydraulic residence time (min) *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) *L = Item 8 * Item 9 * 60*	N/A	N/A	N/A
11 Water surface area at water quality flow depth (ft^2) *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

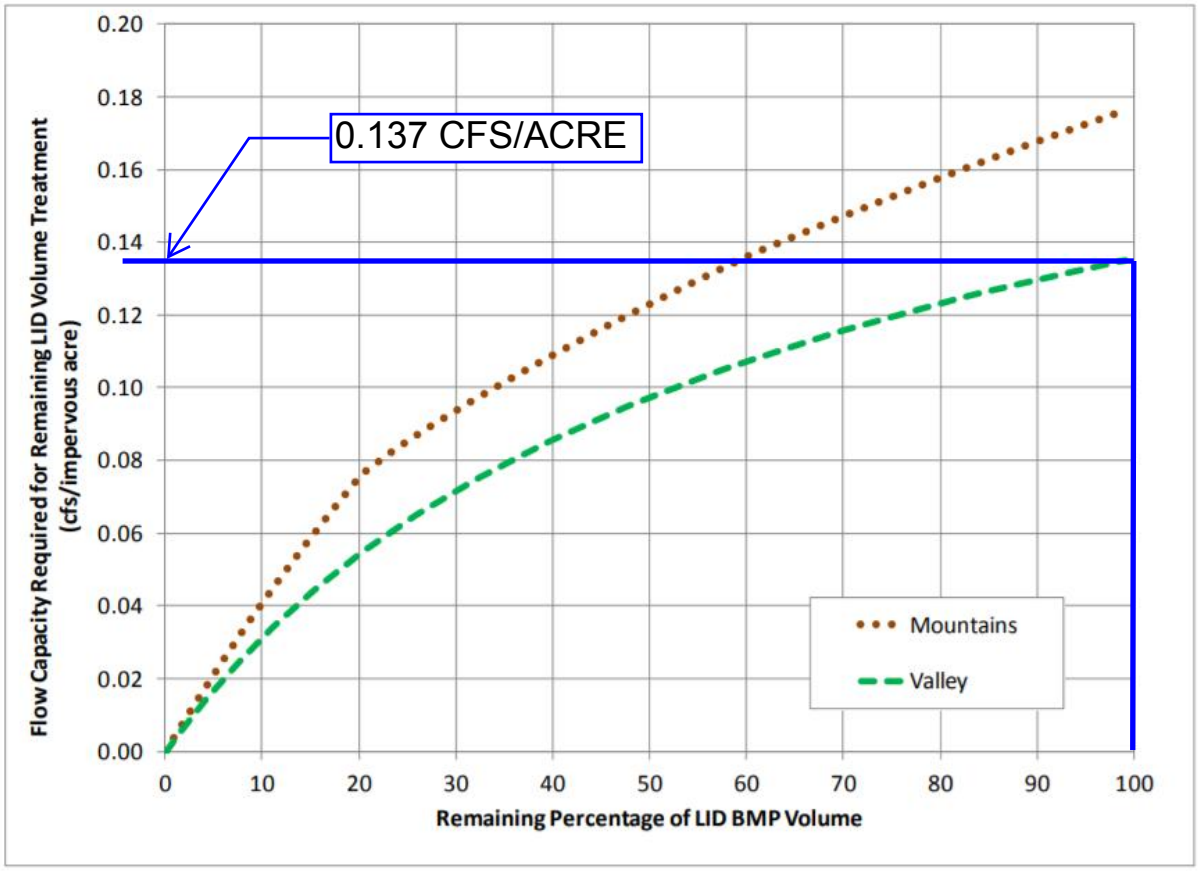

Figure 5-2. Nomograph for Determining Flow-based BMP Capacity Requirement to meet Remaining Unmet DCV

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

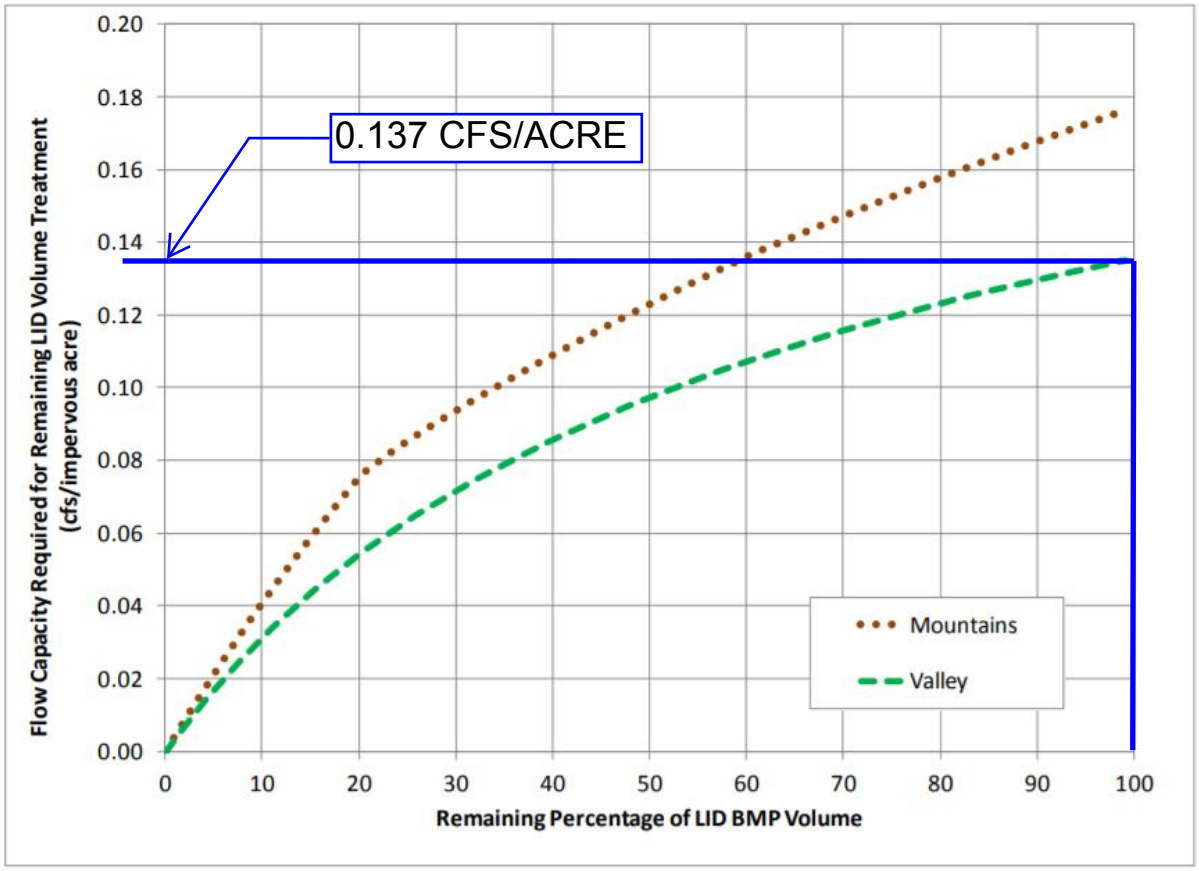

Figure 5-2. Nomograph for Determining Flow-based BMP Capacity Requirement to meet Remaining Unmet DCV

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

398 Via El Centro
Oceanside, CA 92058
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. REMOVE ACCUMULATED TRASH AND DEBRIS IN THE BASIN DURING THE SEMIANNUAL INSPECTIONS. 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

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth **Units:** English **Time series type:** Partial duration

Select location

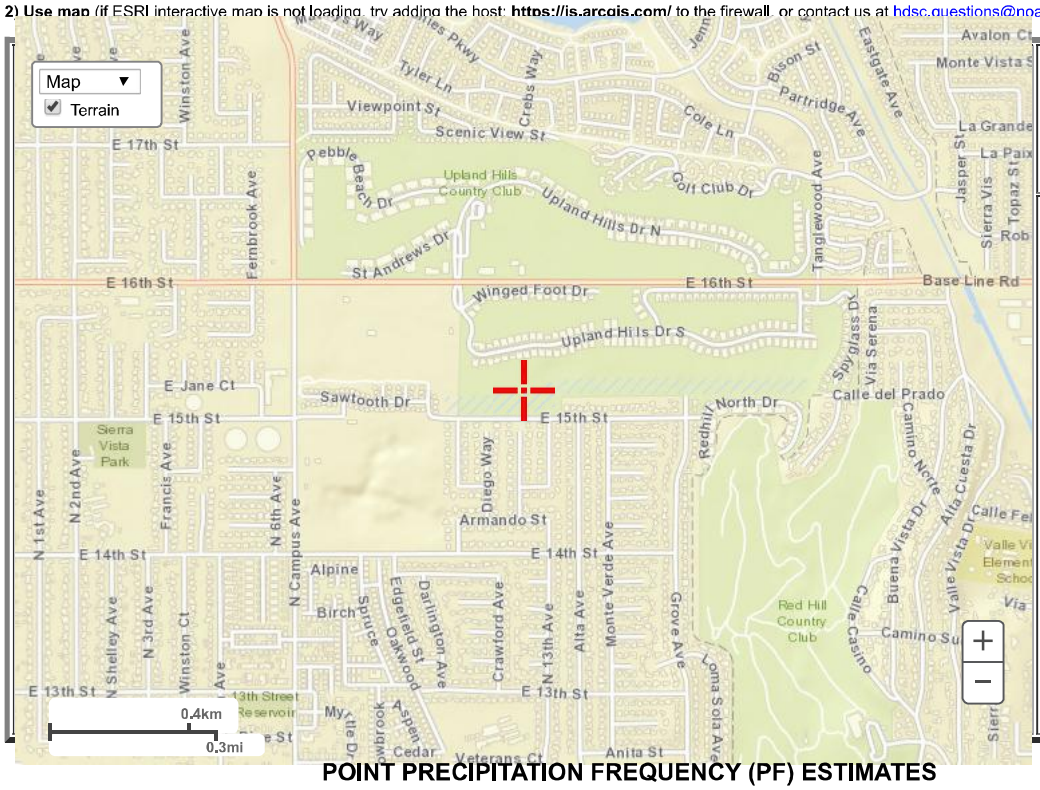
1) Manually:

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,

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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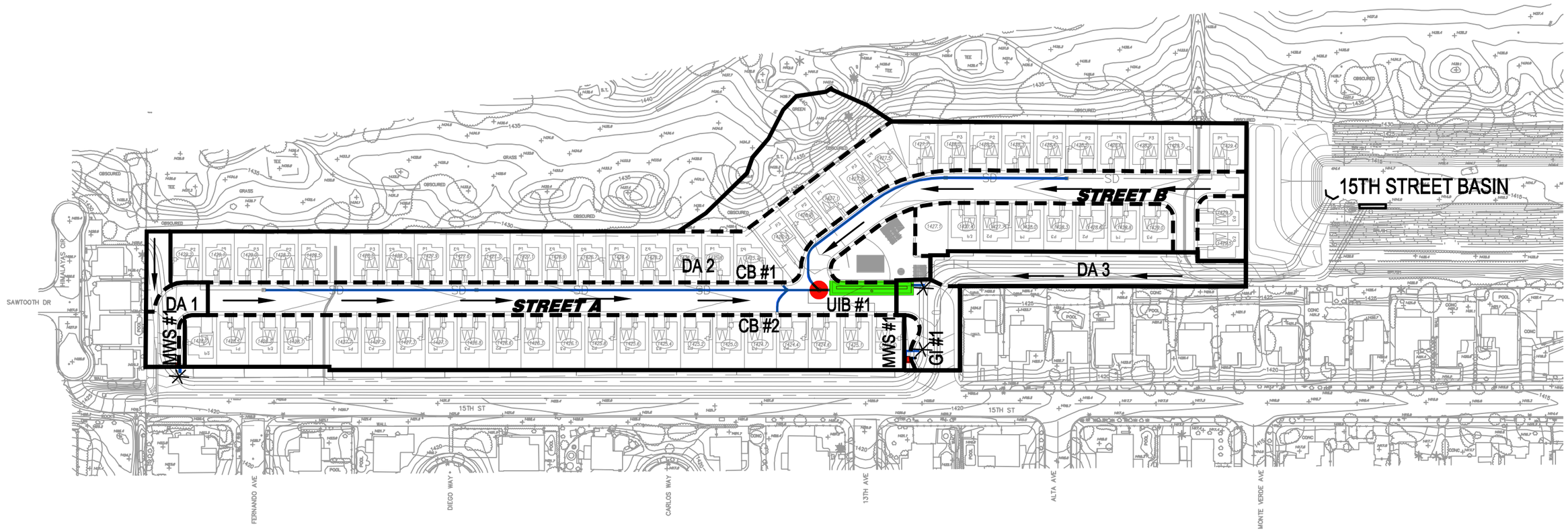
APPENDIX B

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

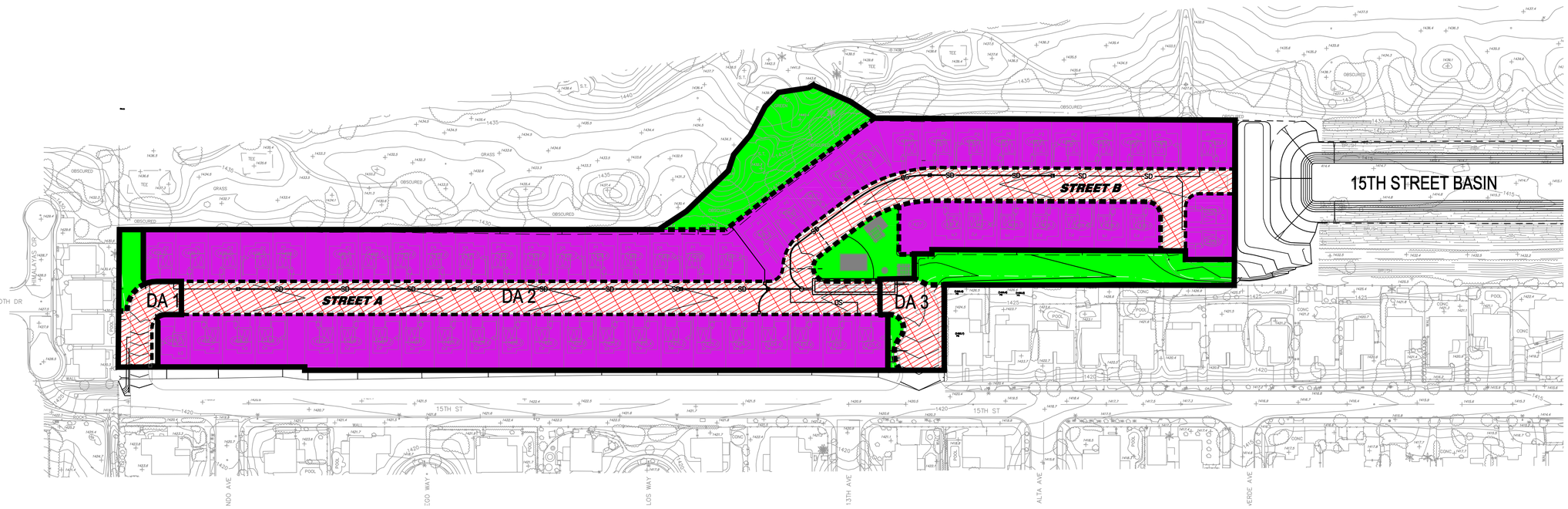
DRAINAGE PLAN

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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200 SOUTH MAIN ST SUITE 300 • CORONA, CA 92881
951•280•3300

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_Basin_Frontier\Hydro\WQMP\EXHIBITS\EXHIBIT B - DRAINAGE AREA CALCULATIONS.dwg

EXHIBIT C – DA SCHEMATIC

DRAINAGE AREA SCHEMATIC

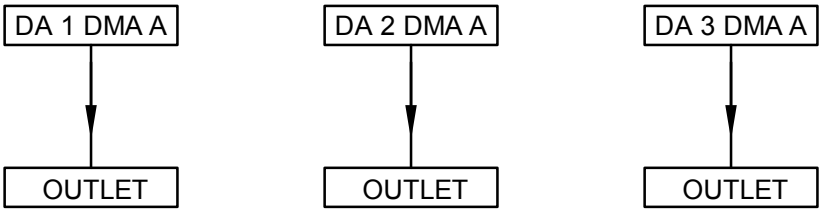

EXHIBIT C

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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.

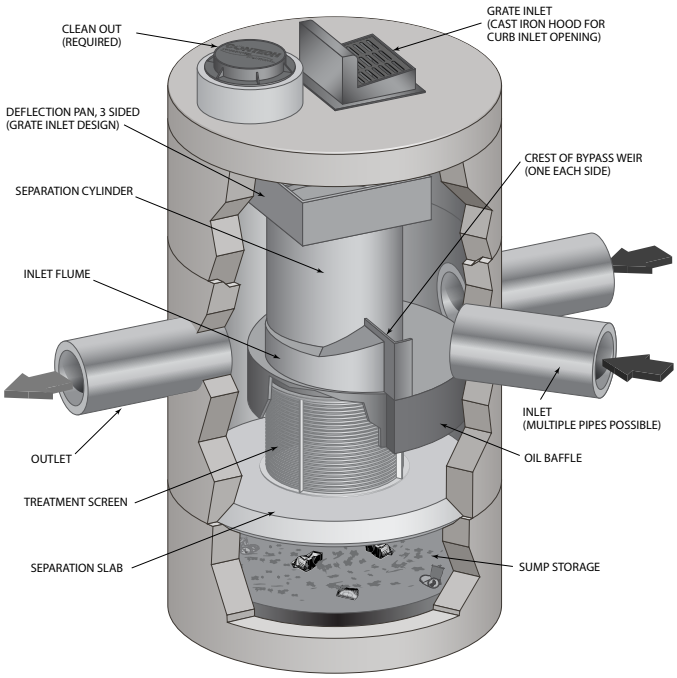
Operation Overview

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 (μm). 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 (μm) or 50 microns (μm).

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 μm) 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 μm) (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.

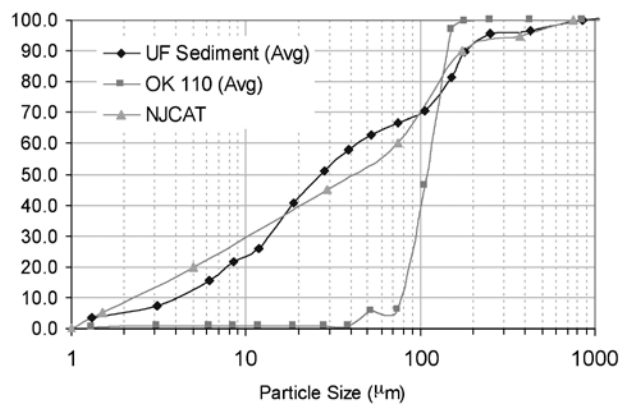


Figure 1. Particle size distributions

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.

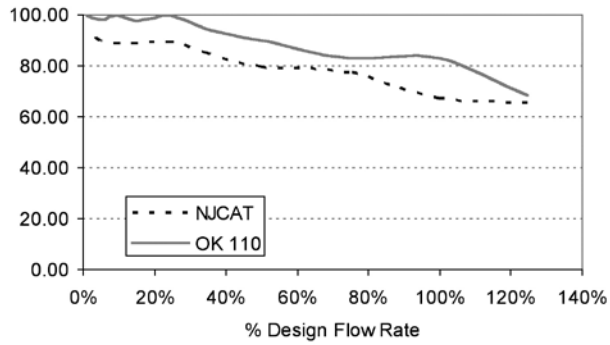


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

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 μm).

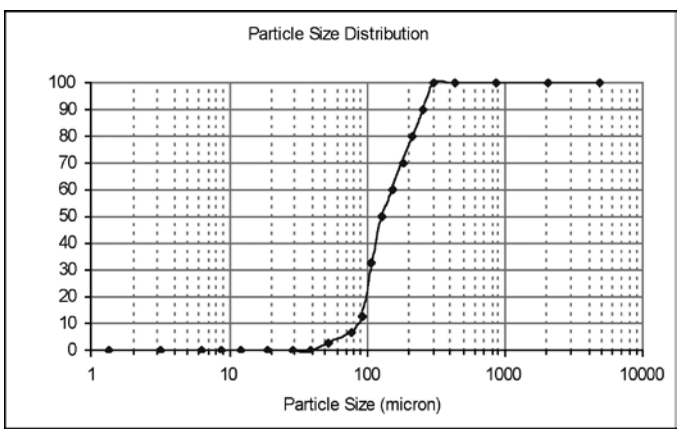


Figure 3. WASDOE PSD

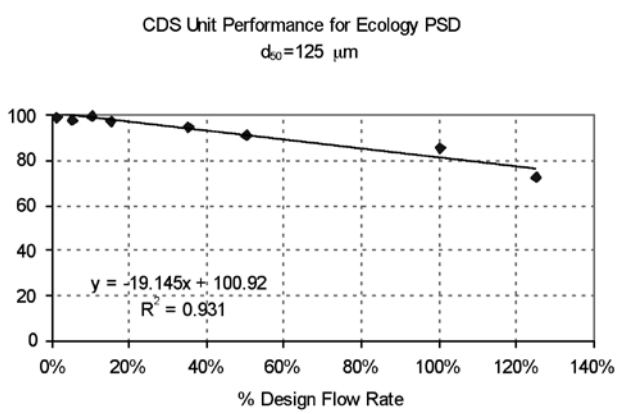


Figure 4. Modeled performance for WASDOE PSD.

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.

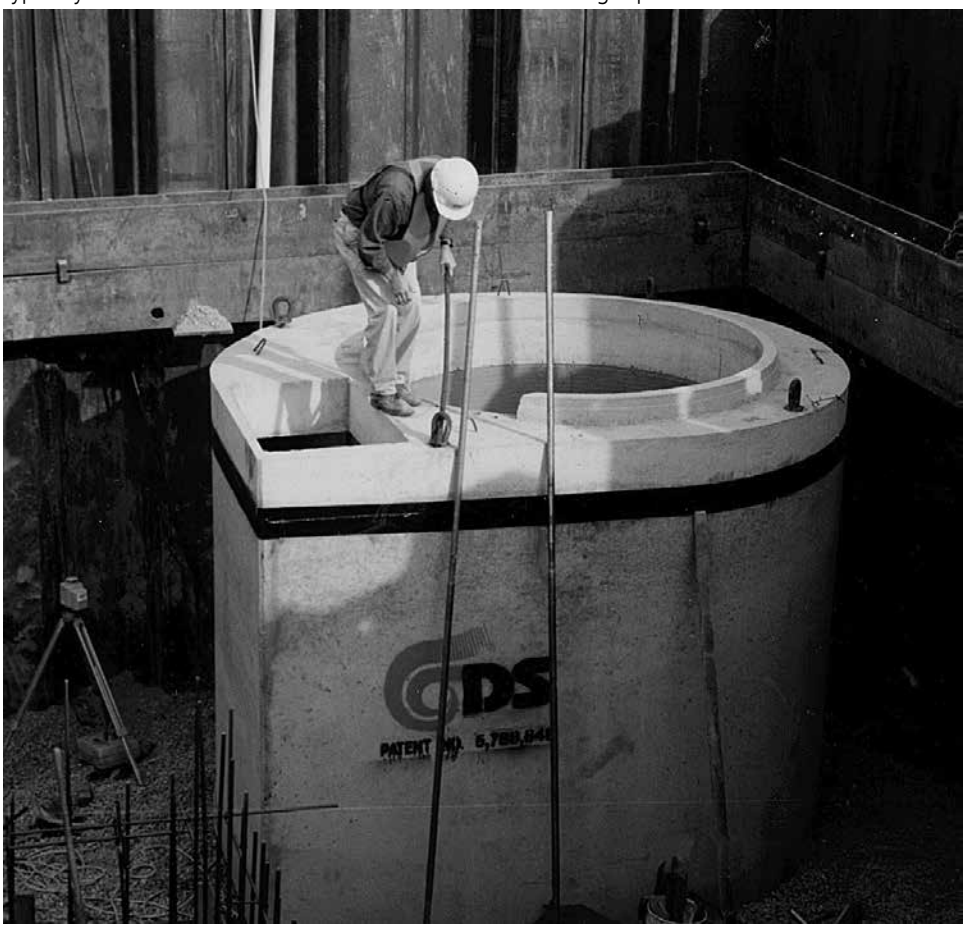
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should 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

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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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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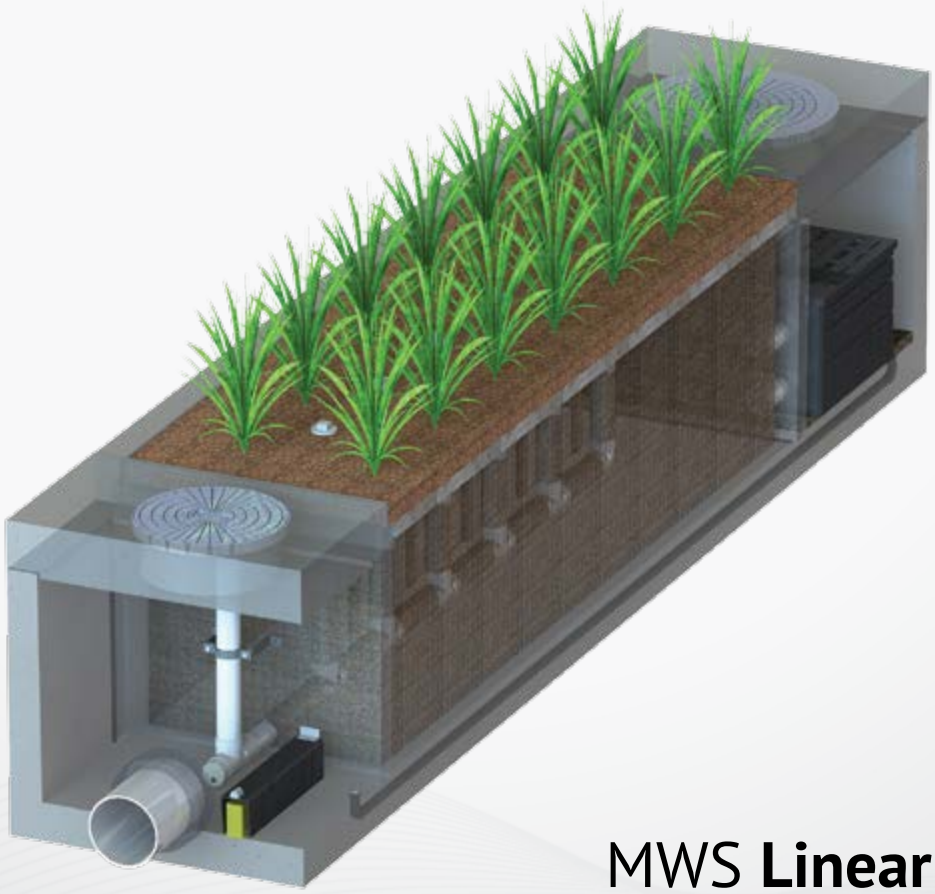
MODULAR WETLAND SYSTEM (MWS) TECHNICAL SPECIFICATIONS

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS **Linear**

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1 Introduction

2 Applications

3 Configurations

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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

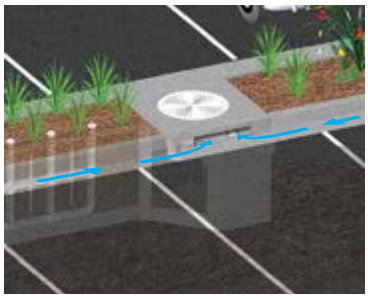
The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

- Agriculture
- Reuse
- Low Impact Development
- Waste Water

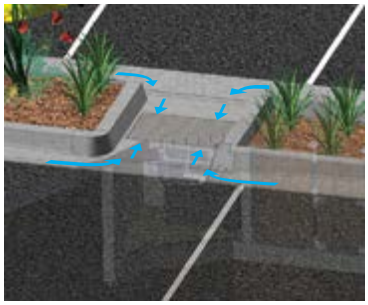
Configurations

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.



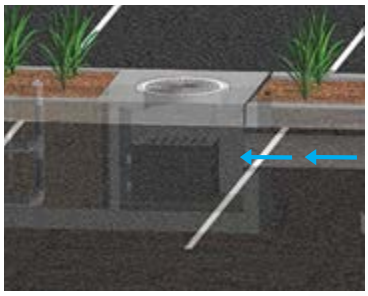
Curb Type

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

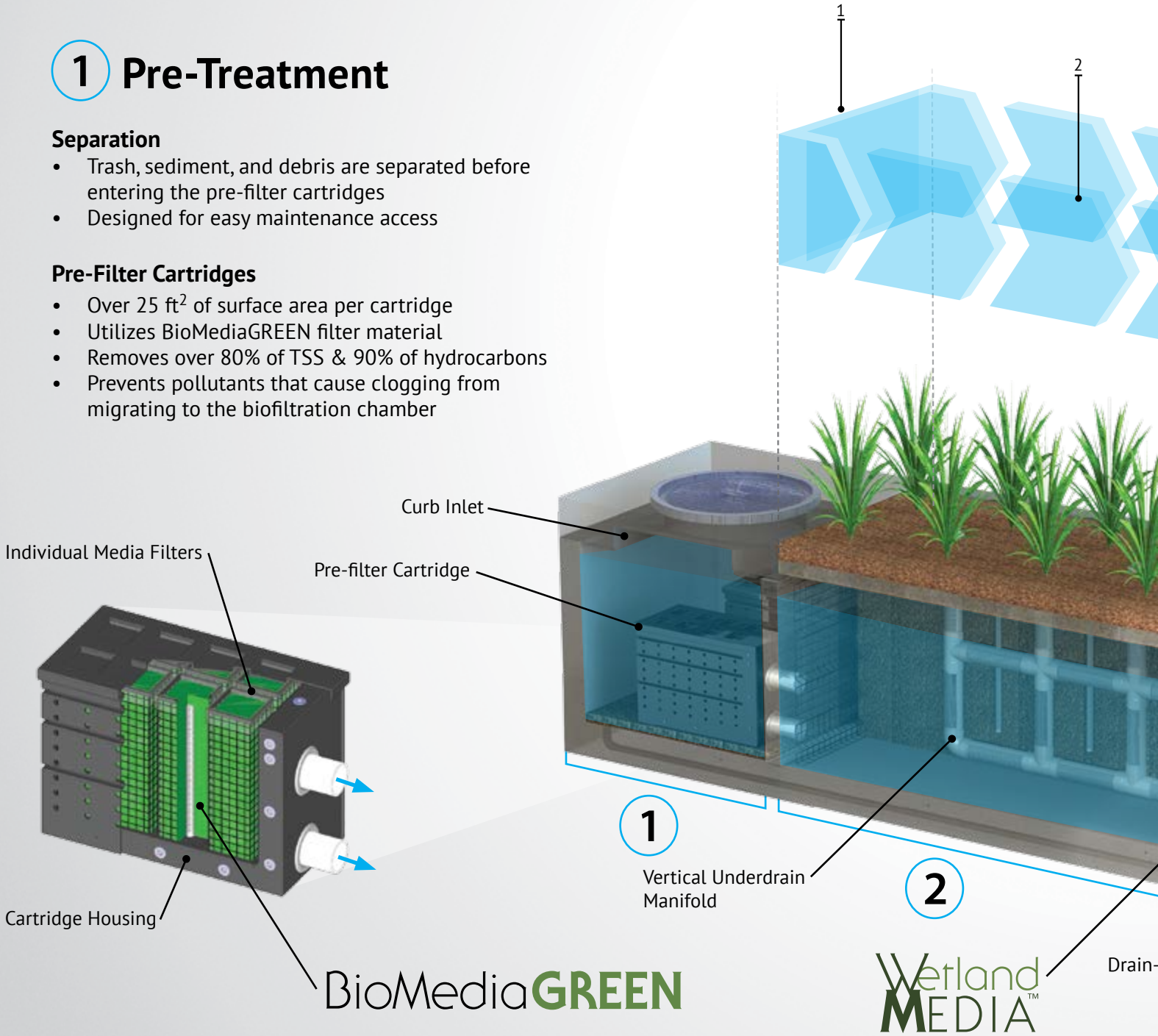
1 Pre-Treatment

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



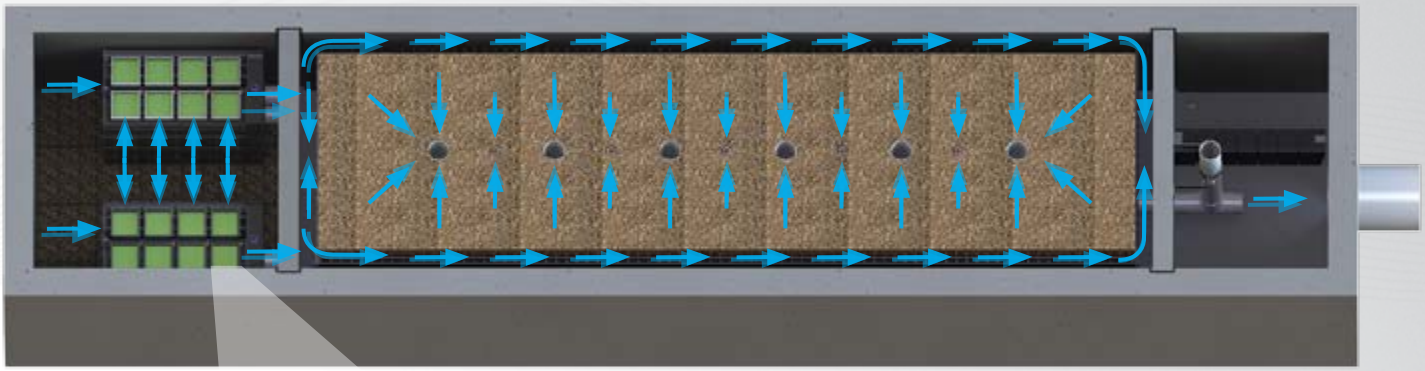


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.

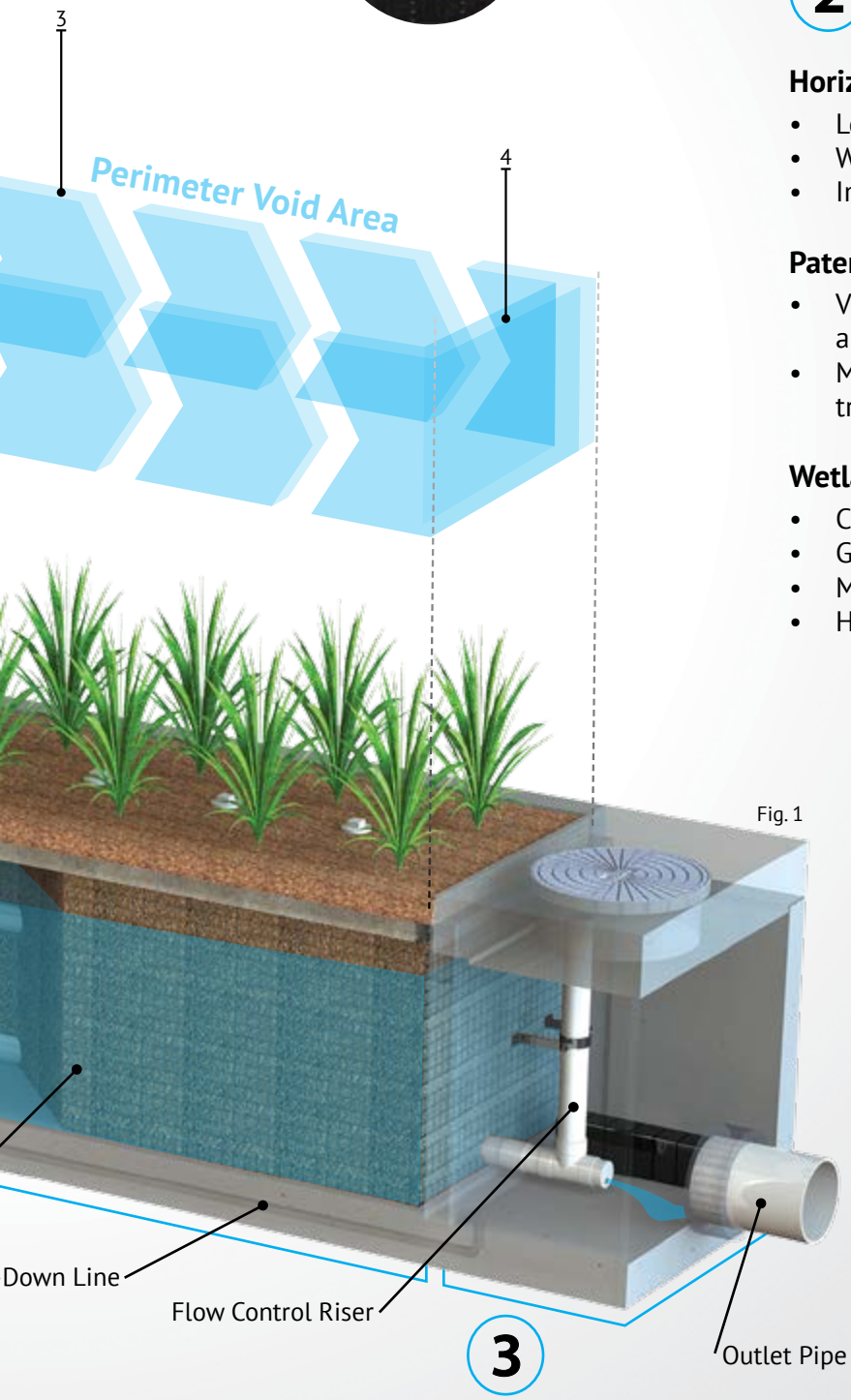


Fig. 1

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.

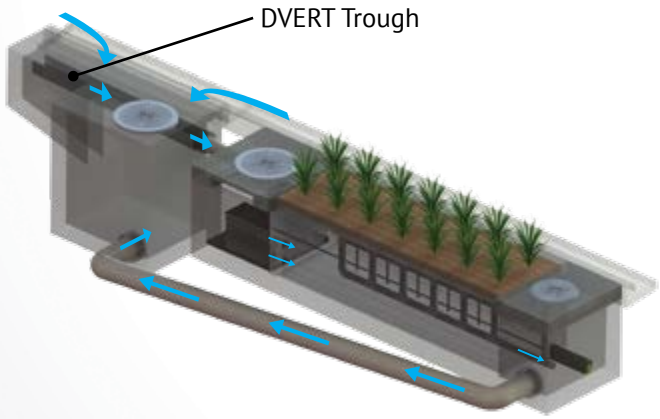
External Diversion Weir Structure

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

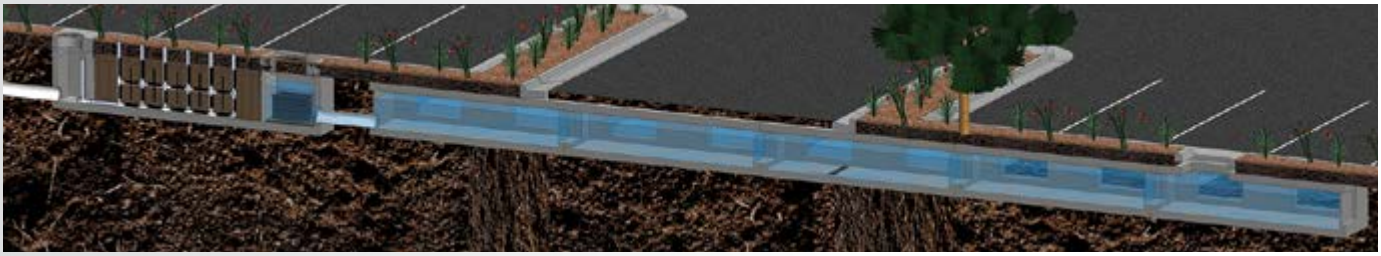
The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line 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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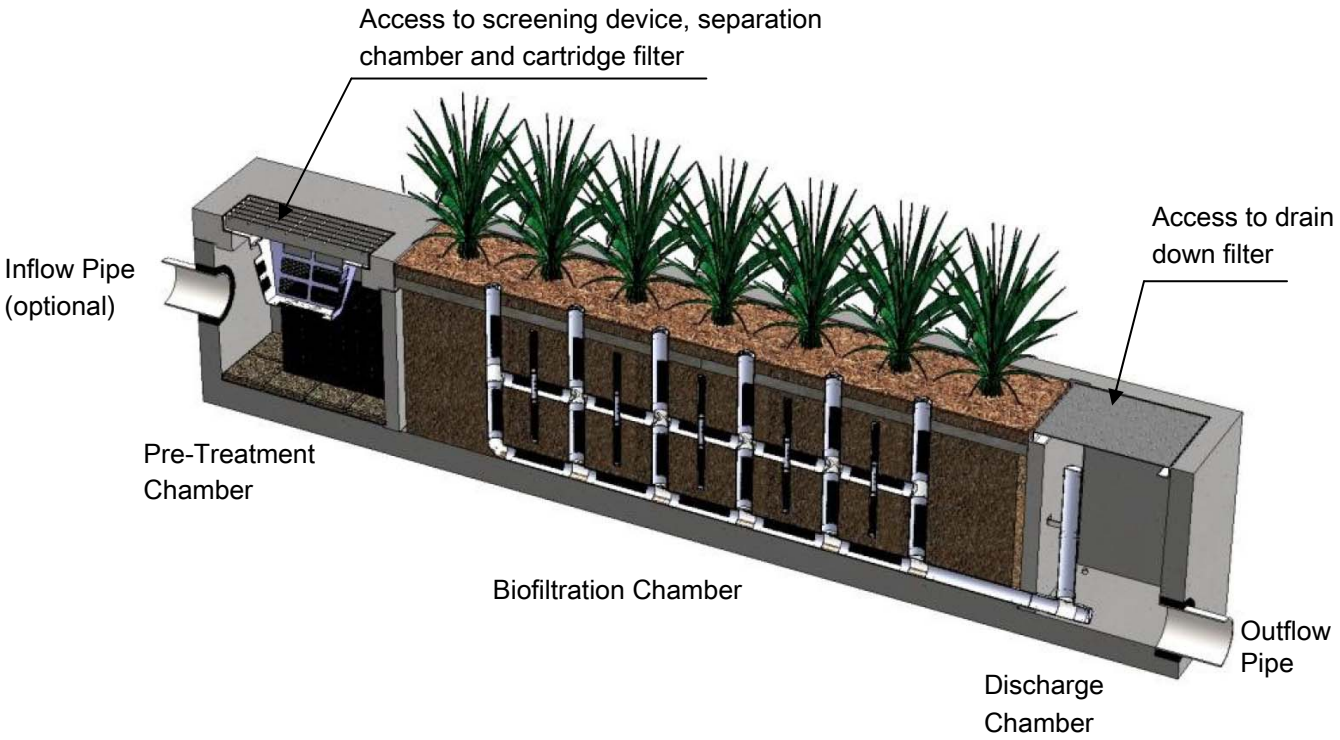
www.ModularWetlands.com | (855) 5MOD-WET | info@ModularWetlands.com

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

For Office Use Only
(Reviewed By)
(Date) Office personnel to complete section to the left.

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 _____

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 ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

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 _____

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: 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:

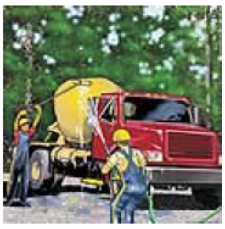
www.sbcountystormwater.org

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

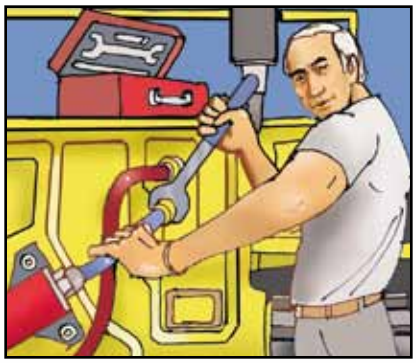
Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for 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

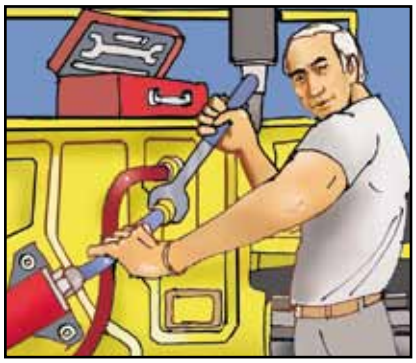
Reduce la cantidad al ordenar el material, solo ordena lo necesario. Usa materiales que se puedan reciclar cuando sea posible. Se puede reciclar el aspfalto, concreto, madera y la vegetacion. Materiales no reciclados se deven llevar a lugares de desechos peligrosos. Para mas información llama al (909) 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

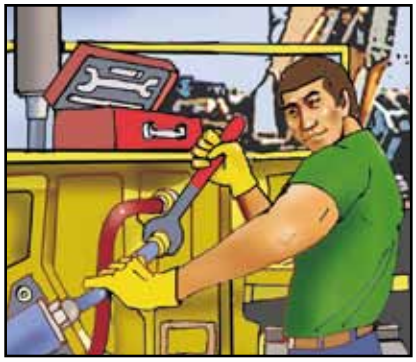
STORMWATER Pollution Prevention

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

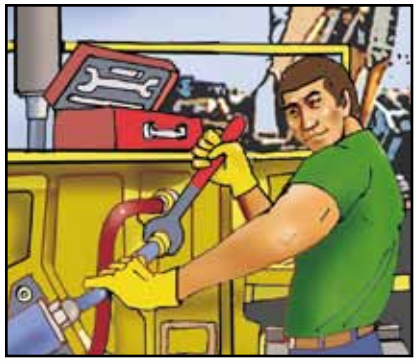
Asfalto, mezcla y materiales de excavaciones del pavimento acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación 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

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San Bernardino County Stormwater Program
825 East Third Street · Room 127
San Bernardino, CA 94215-0835

STORMWATER Pollution Prevention

LANDSCAPE MAINTENANCE

Pollution Prevention STORMWATER

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

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Redlands · Rialto · San Bernardino · San Bernardino County · San Bernardino County Flood Control District · Upland · Yucaipa

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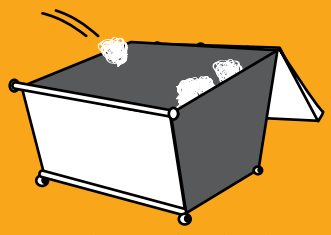
COMMERCIAL TRASH ENCLOSURES

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.**

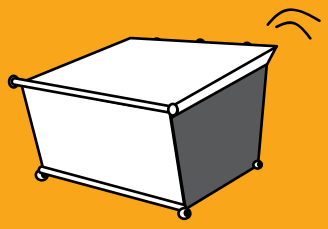
PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

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.

✓ 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)

- ✓ 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.

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.

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.

San Bernardino County STORMWATER PROGRAM

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

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

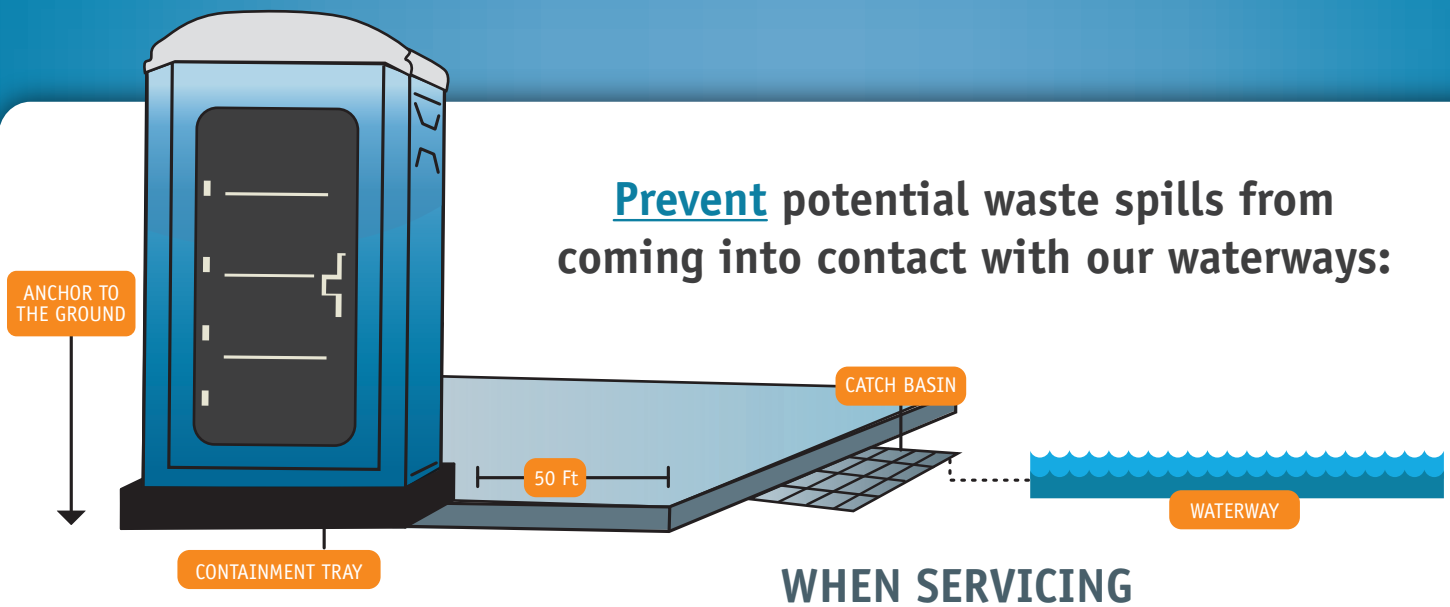
- **San Bernardino County Storm Water Program Annual Status Report:** The Annual Status Report is a requirement of the NPDES permit for submittal to the Regional Boards and United States Environmental Protection Agency. The report presents an analysis and assessment of permit compliance activities.

▶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**

sbcountystormwater.org

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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.

Pollution Prevention STORMWATER

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

Pollution Prevention

STORMWATER

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

City of Yucaipa (909) 797-2489 x 243

San Bernardino County
Stormwater Program
825 East Third Street • Room 201
San Bernardino, CA 94215-0835

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

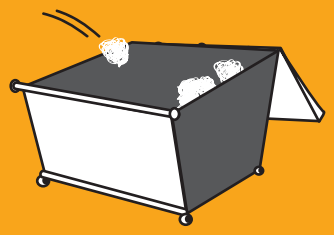
COMMERCIAL TRASH ENCLOSURES

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.**

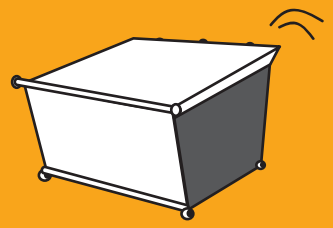
PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

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

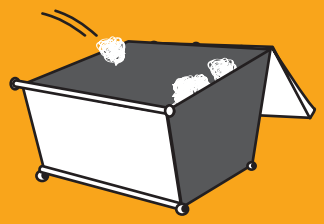
CONTENEDORES COMERCIALES PARA LA BASURA

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.

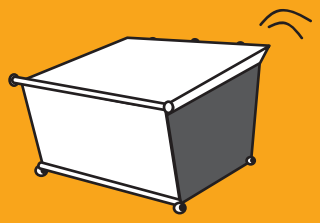
SIGA ESTOS PASOS PARA PROTEGER LA CALIDAD DEL AGUA

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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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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Figure 2 – Trench Location Map

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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 15th 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 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

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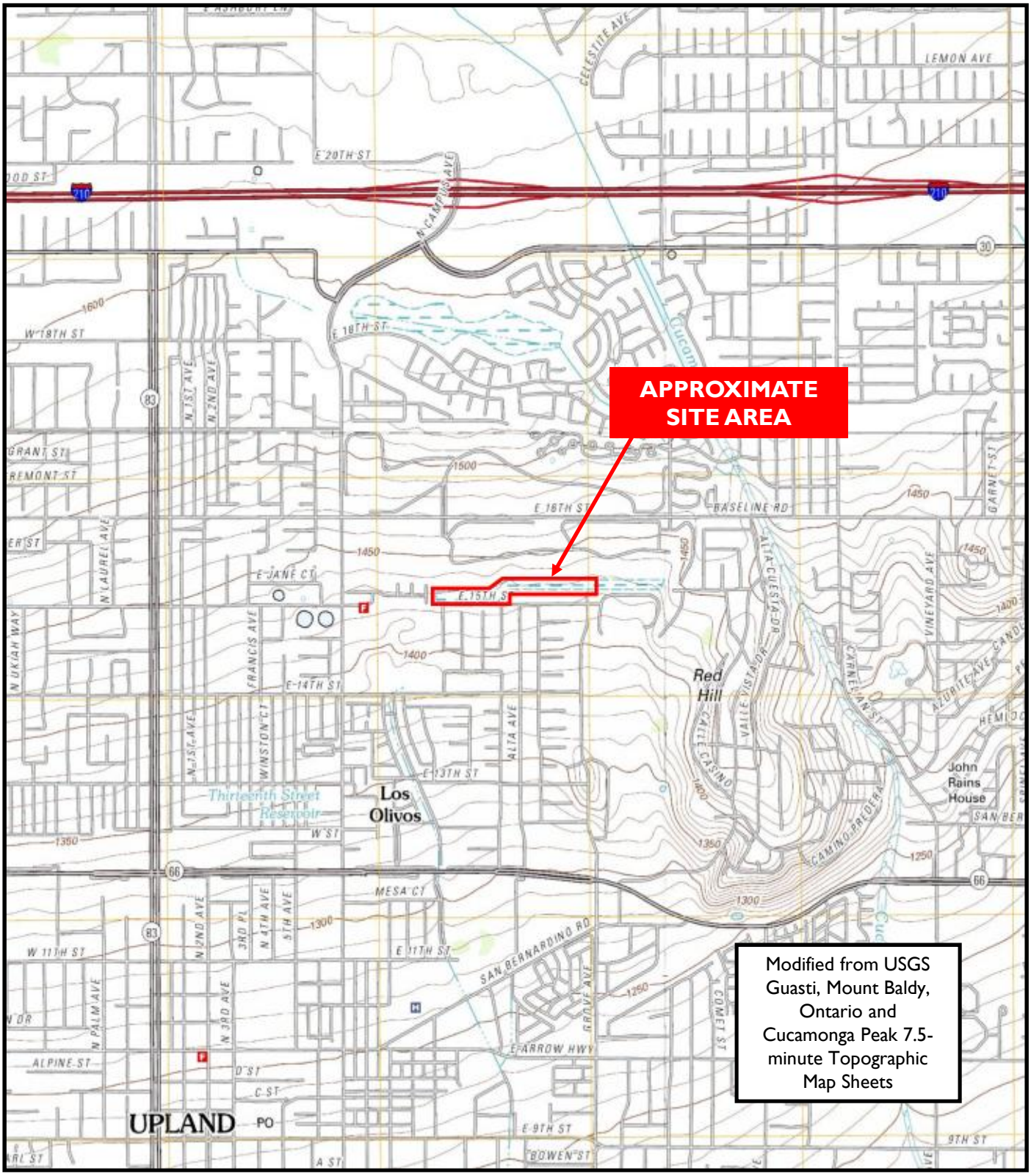


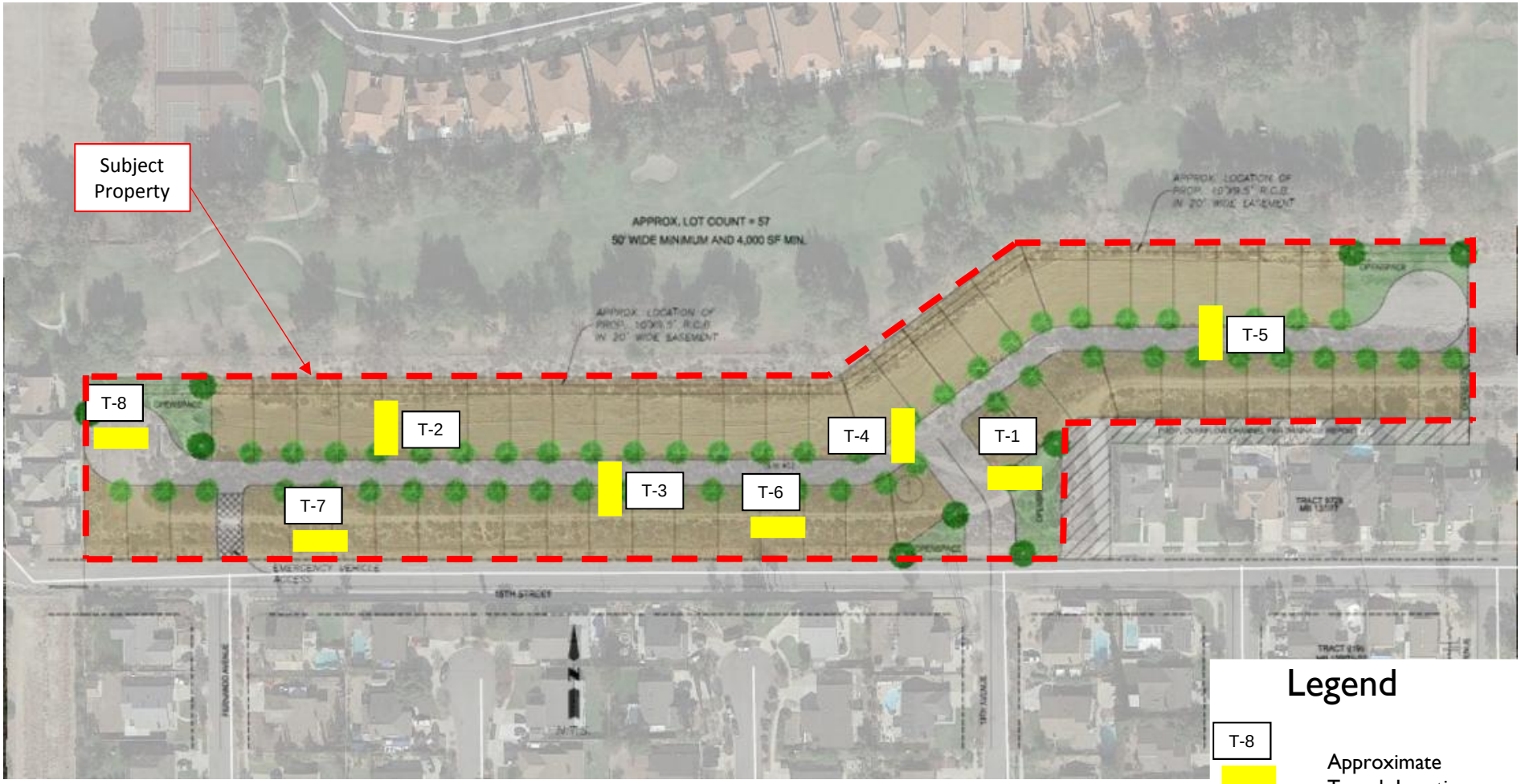
Frontier Enterprises
APNs 1045-121-02 and 1045-151-34
Upland, San Bernardino County, California

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

GEOTEK

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** Silty gravelly f-c SAND, gray, dry, some cobbles, some roots			EI, SR
			GP	F-c sandy GRAVEL, brownish gray, slightly moist, few cobbles 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) 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-3** — **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**UNDOCUMENTED ARTIFICIAL FILL** Silty f-c SAND, gray, dry, some gravel, few cobbles, some roots			
5			SP	**ALLUVIUM** Gravelly f-c SAND, grayish brown, slightly moist, few cobbles, one large boulder up to 24" Same as above, trace rootlets			
10 15				**TRENCH TERMINATED AT 6 FEET (REFUSAL)** No groundwater Backfilled with excavated soils			

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** Silty f-c SAND, brownish gray, dry, some gravel, few cobbles, some roots			
5			SP	F-c SAND, brown, slightly moist to moist, some gravel, trace cobble, few rootlets Same as above, no rootlets			
10 15				**TRENCH TERMINATED AT 6 FEET (REFUSAL)** No groundwater Backfilled with excavated soils			

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** 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** 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

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: E15TH 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-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
								PREWATER 5GAL
	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, Δt =	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, Δt =	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.

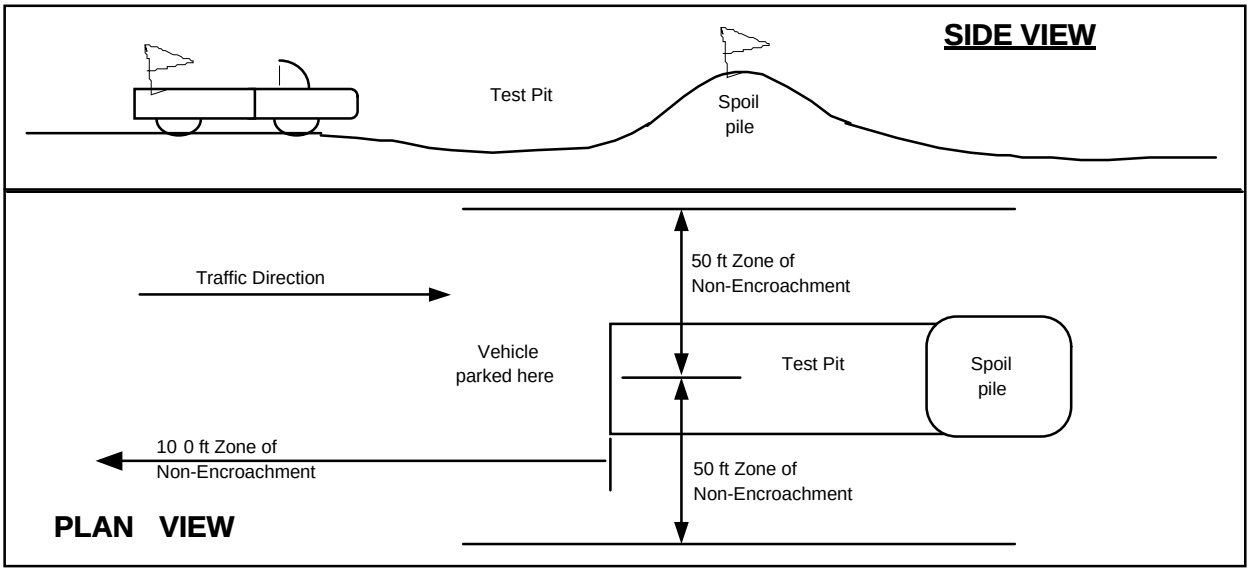
Test Pits Location, Orientation and Clearance

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.

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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F: 949.716.7461

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.

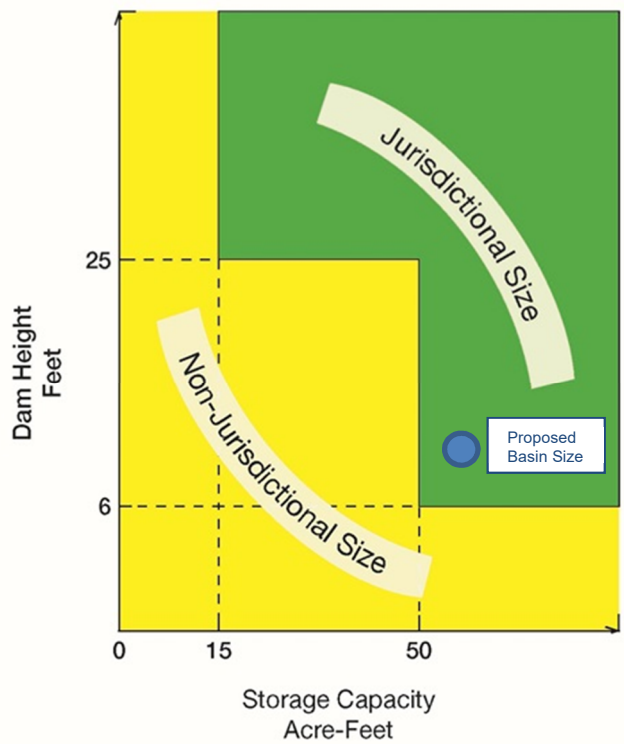


Figure 1 – DSOD Jurisdictional Size Chart

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

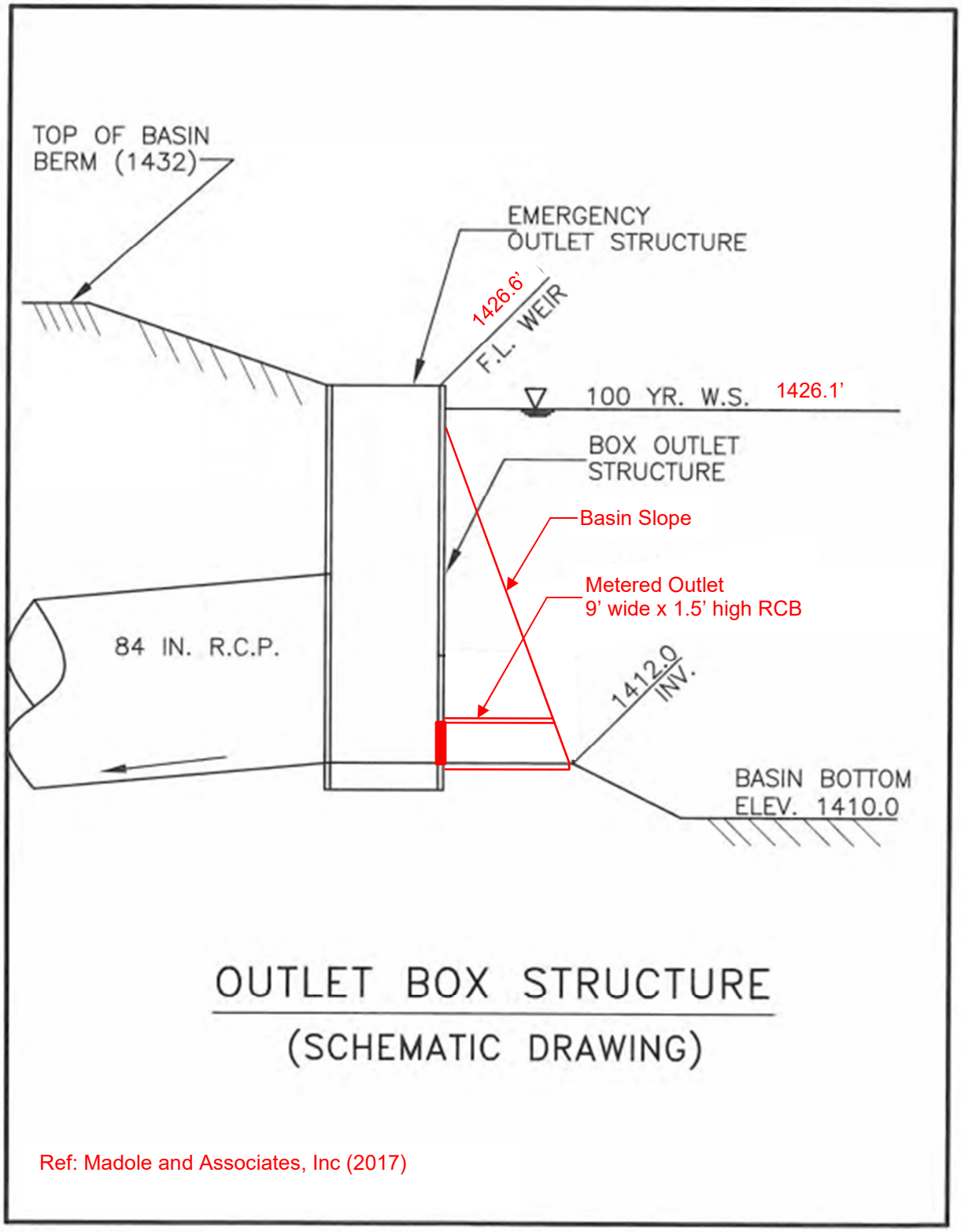
Contour Elevation	Area (sf)	Depth (ft)	Volume (cu. ft)	Volume (ac. ft)	Total Volume (ac. ft)	Comments
1410						
		0.5				
1410.5						
		0.5				
1411						
		0.5				
1411.5						
		0.5				
1412	43,125				0.00	
		0.5	22,535	0.52		
1412.5	47,013				0.52	
		0.5	24,478	0.56		
1413	50,900				1.08	
		0.5	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



Hydraulic Calculations and Detention Basin Flood Routing Analysis

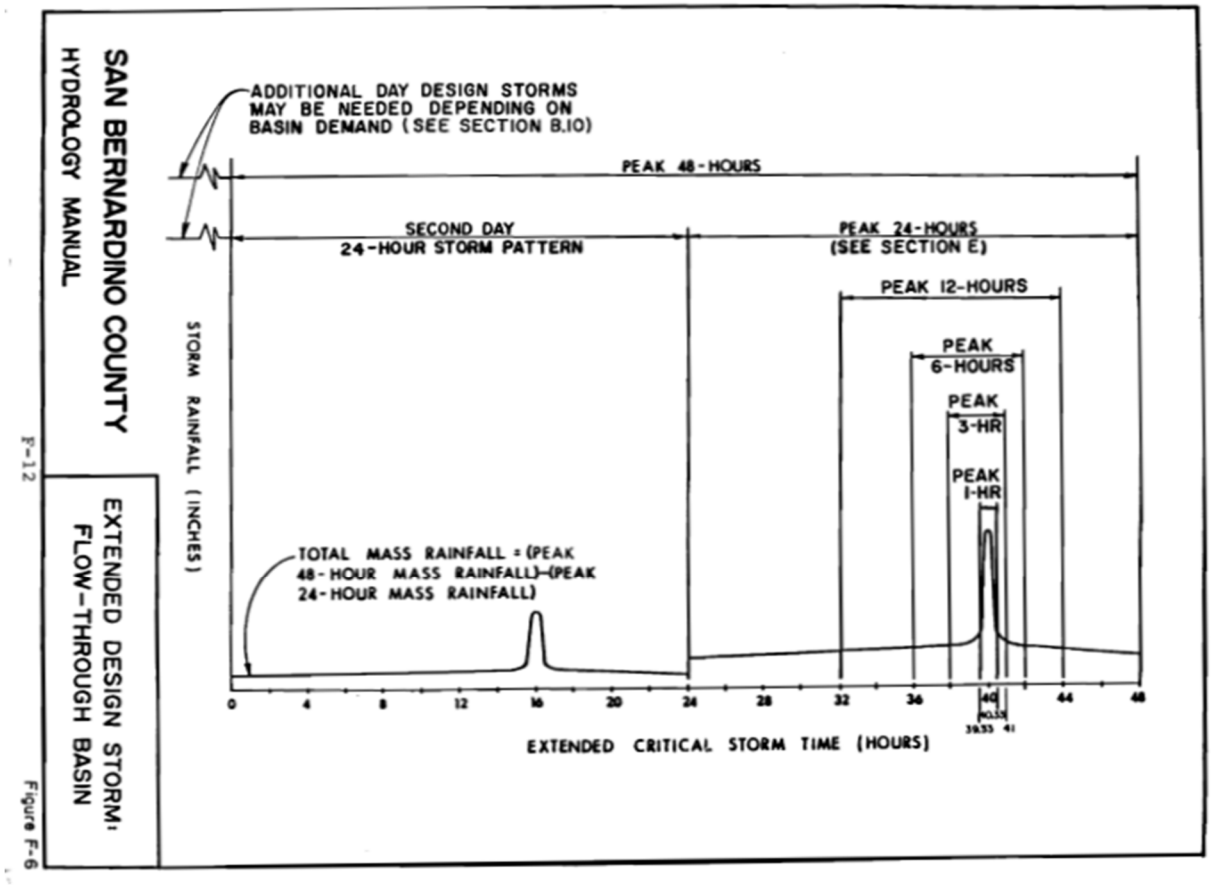
The discharge through the new outlet for a range of water surface elevations was calculated based on inlet control using the FHWA Hydraulic Design of Highway Culverts Manual, Chart 8, Scale 1, Headwater Depths for Box Culverts with Inlet Control. The analysis was run using the Dodson computer program. 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	Headwater (ft) 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

==========

BOX CULVERT ANALYSIS COMPUTER PROGRAM Version 1.6 Copyright (c) 1986
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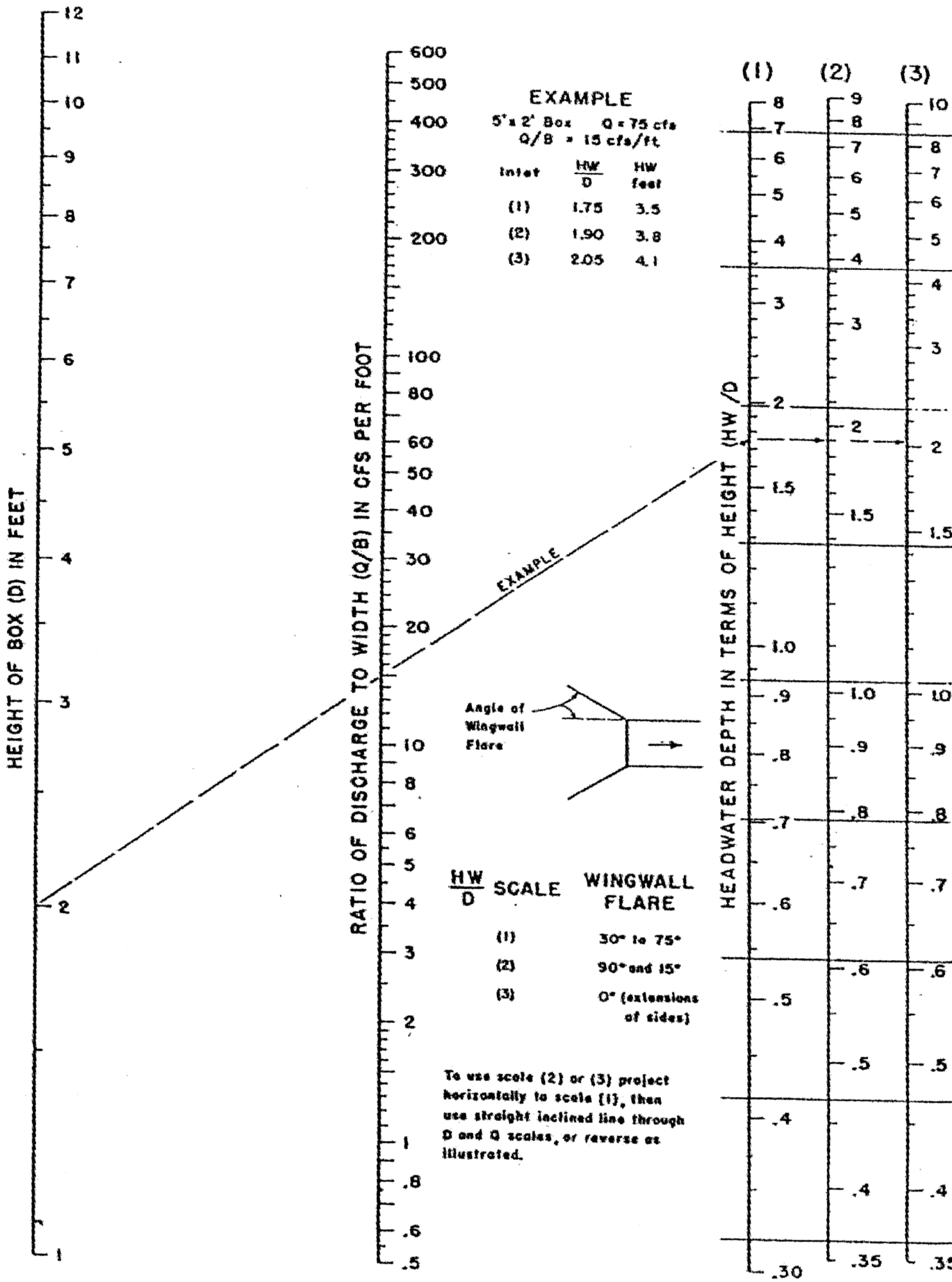
CHART 8


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
------------------------------------------------------------------------------
```

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==============================================================================

                    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<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                __effective depth
                   -----------          |   (and volume)
                  |           |    |    |
                  |           |    |....V........
                  | detention |<-->|           outflow
                  |   basin   |    |.........______
                   -----------     |    ^    |  \
                       |           |  dead   |   basin outlet
                       V           | storage |
                    OUTFLOW         ---------
                  (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    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
               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

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____________________________________________________________________________
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             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)
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             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
------------------------------------------------------------------------------
```

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==============================================================================

                        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
```

```
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                 Duration
        Peak Flow Rate                      (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<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                __effective depth
                   -----------          |   (and volume)
                  |           |    |    |
                  |           |    |....V........
                  | detention |<-->|           outflow
                  |   basin   |    |.........______
                   -----------     |    ^    |  \
                       |           |  dead   |   basin outlet
                       V           | storage |
                    OUTFLOW         ---------
                  (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    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)
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

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____________________________________________________________________________
****************************************************************************

             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)
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                           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          "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
------------------------------------------------------------------------------
```

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==============================================================================

                        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<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                __effective depth
                   -----------          |   (and volume)
                  |           |    |    |
                  |           |    |....V........
                  | detention |<-->|           outflow
                  |   basin   |    |.........______
                   -----------     |    ^    |  \
                       |           |  dead   |   basin outlet
                       V           | storage |
                    OUTFLOW         ---------
                  (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 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)
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

```
==============================================================================
 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)
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

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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.)
```

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE 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
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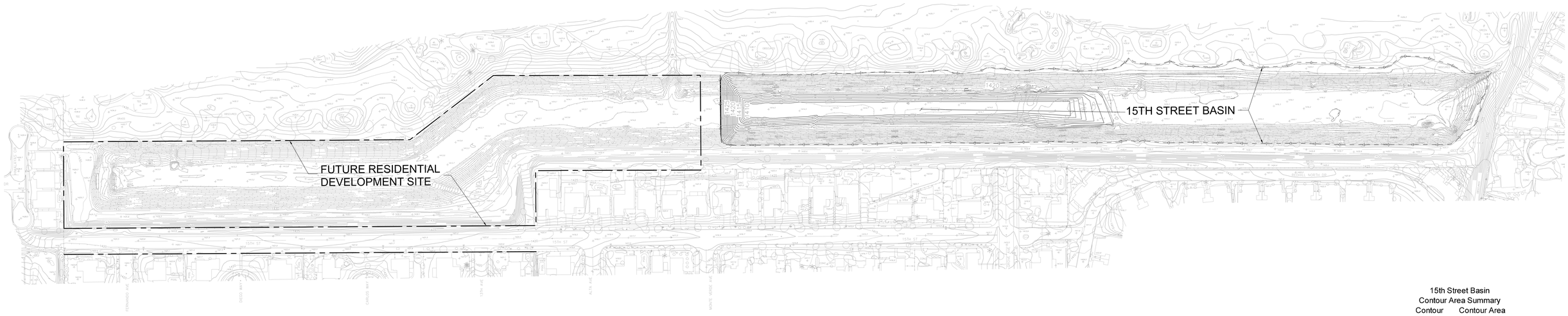

15th Street Basin
Contour Area Summary

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
PROFESSIONAL CORPORATION
1825 CALIFORNIA BOULEVARD, SUITE 110
NAPA, CALIFORNIA 94559
(925) 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

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
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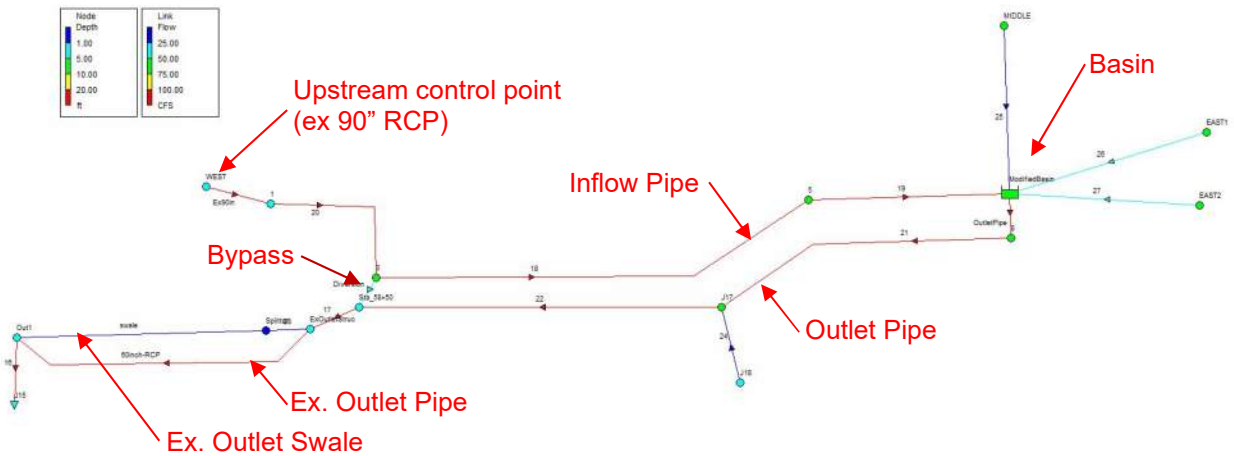
Multiple alternatives were performed for this project. The main areas of concern were the basin maximum water surface elevation (and its impact on the upstream existing and proposed drainage system), the upstream existing 90-inch RCP system (with its existing lateral connections), and the existing downstream 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

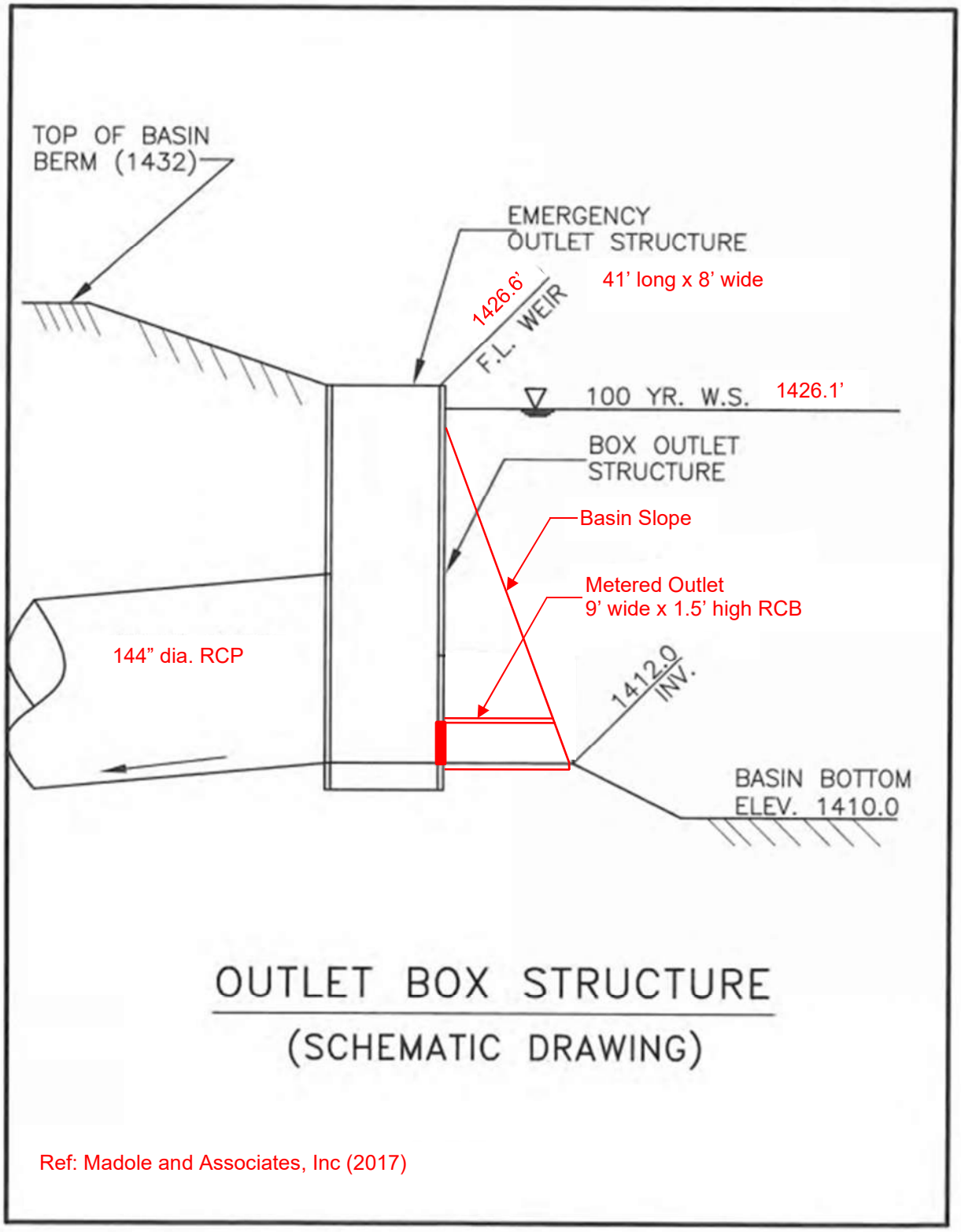
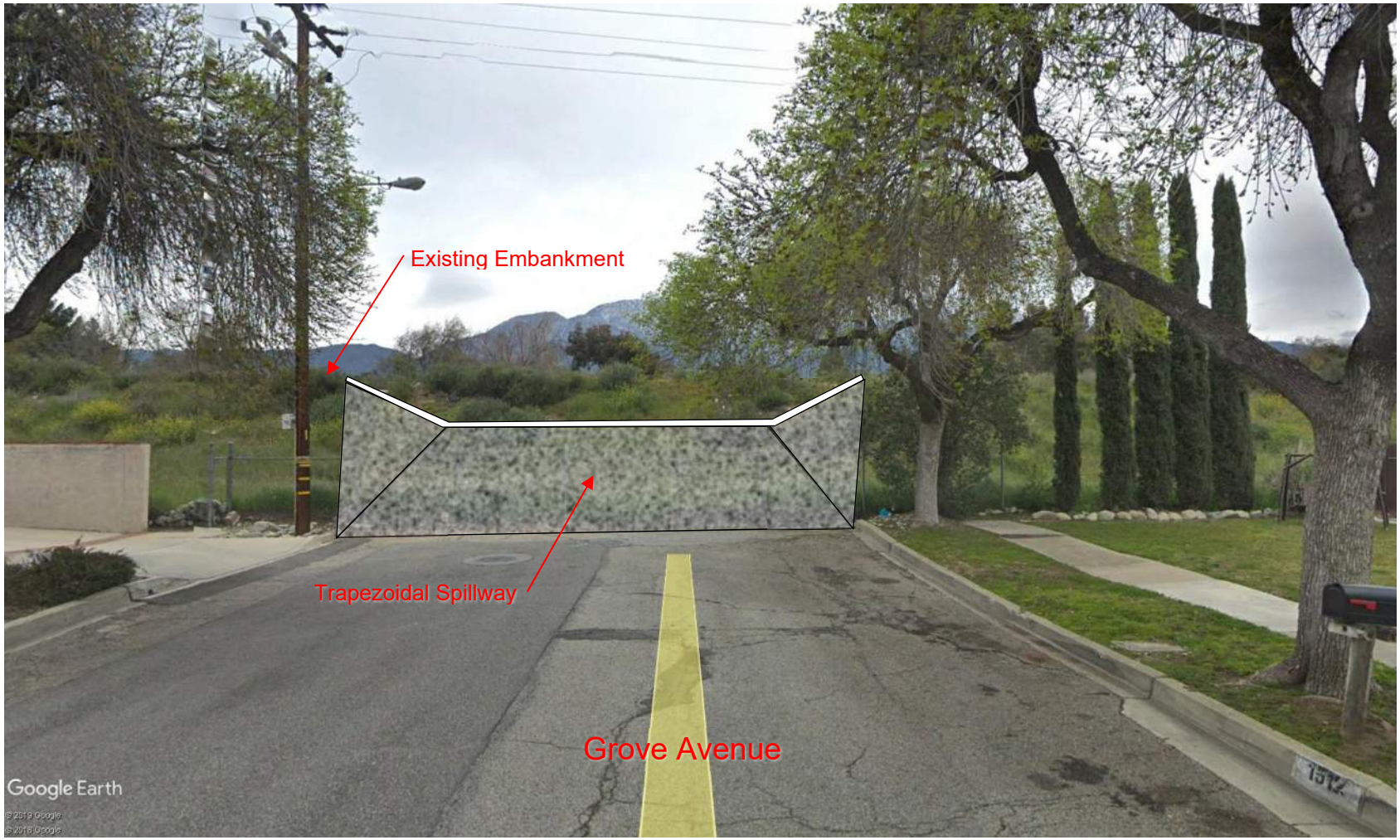


Figure 3 – Open Channel Spillway Vicinity Map

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

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

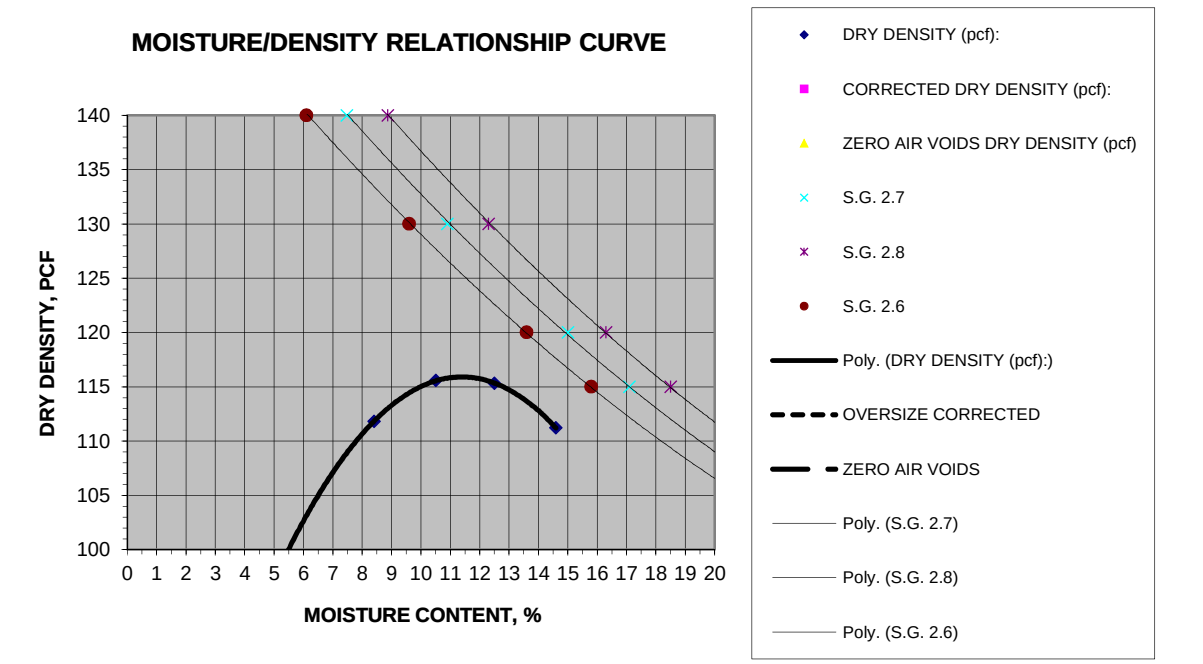
Client: Frontier Enterprises
Project: Tract No. 20245
Location: Upland
Material Type: Gray Brown Gravelly Silty F-M Sand
Material Supplier: -
Material Source: -
Sample Location: Bulk #1

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 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, %

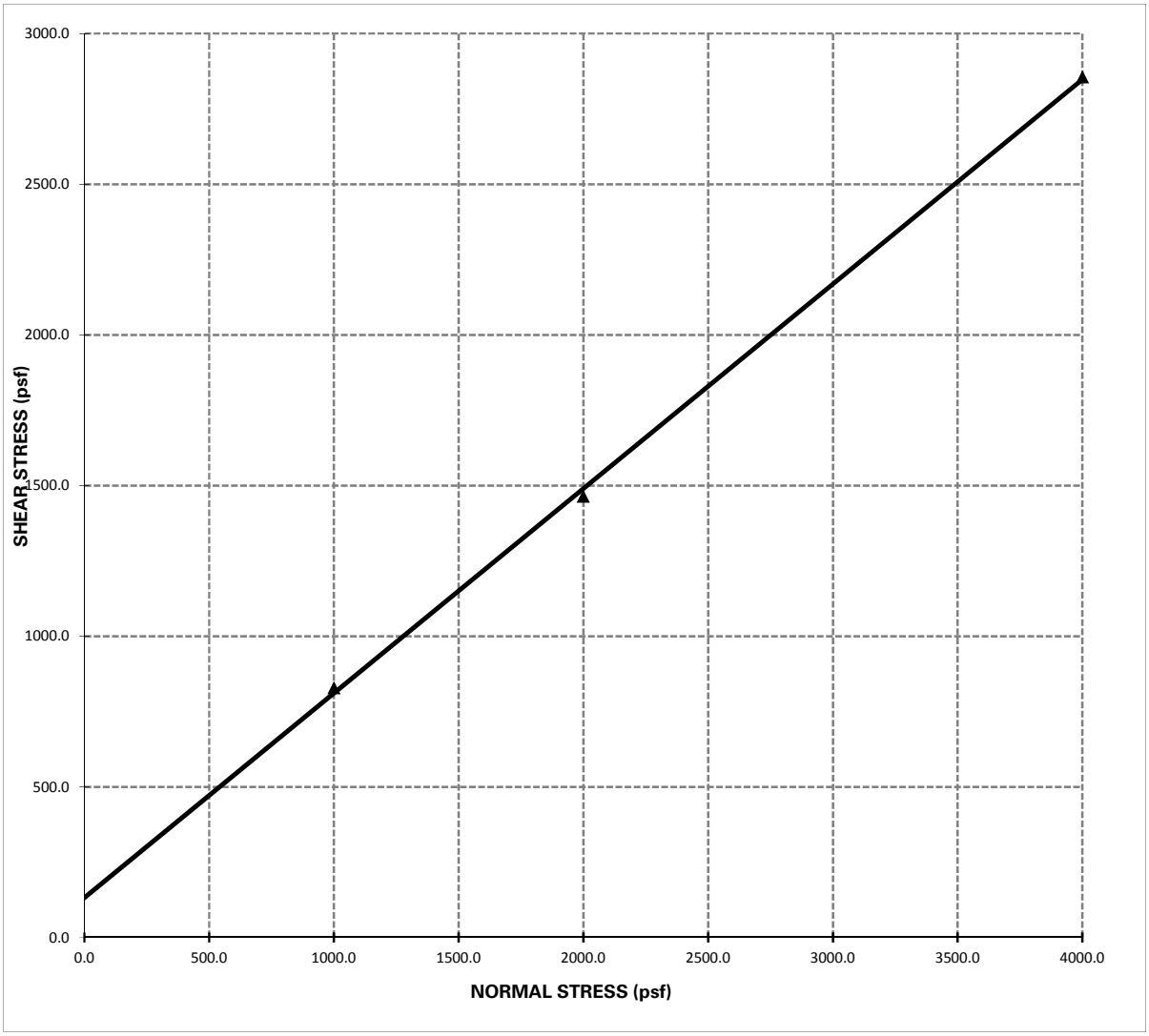
Classification:

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

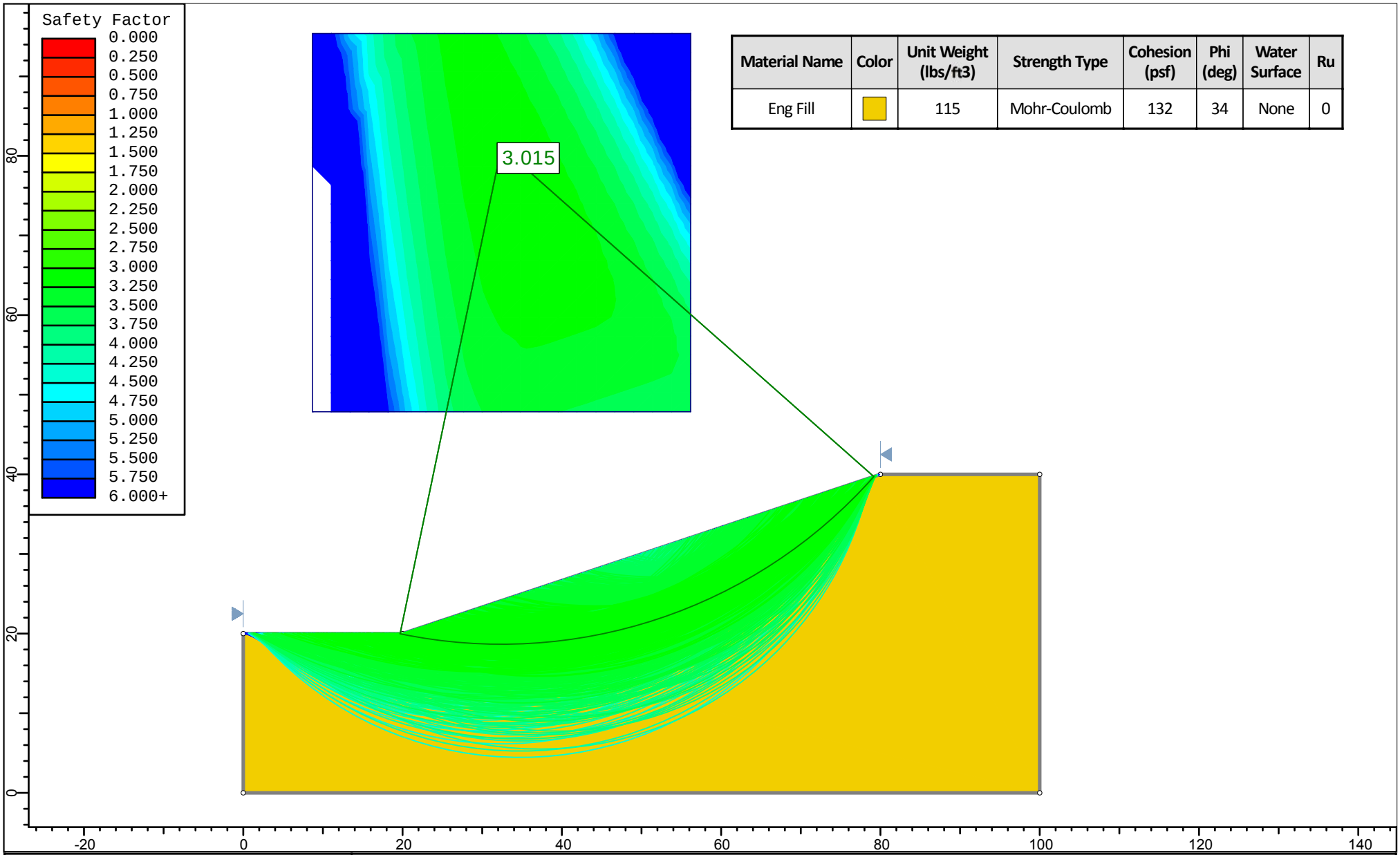


Shear Strength: Φ = **34.2 °** , **C = 132.00 psf**

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.

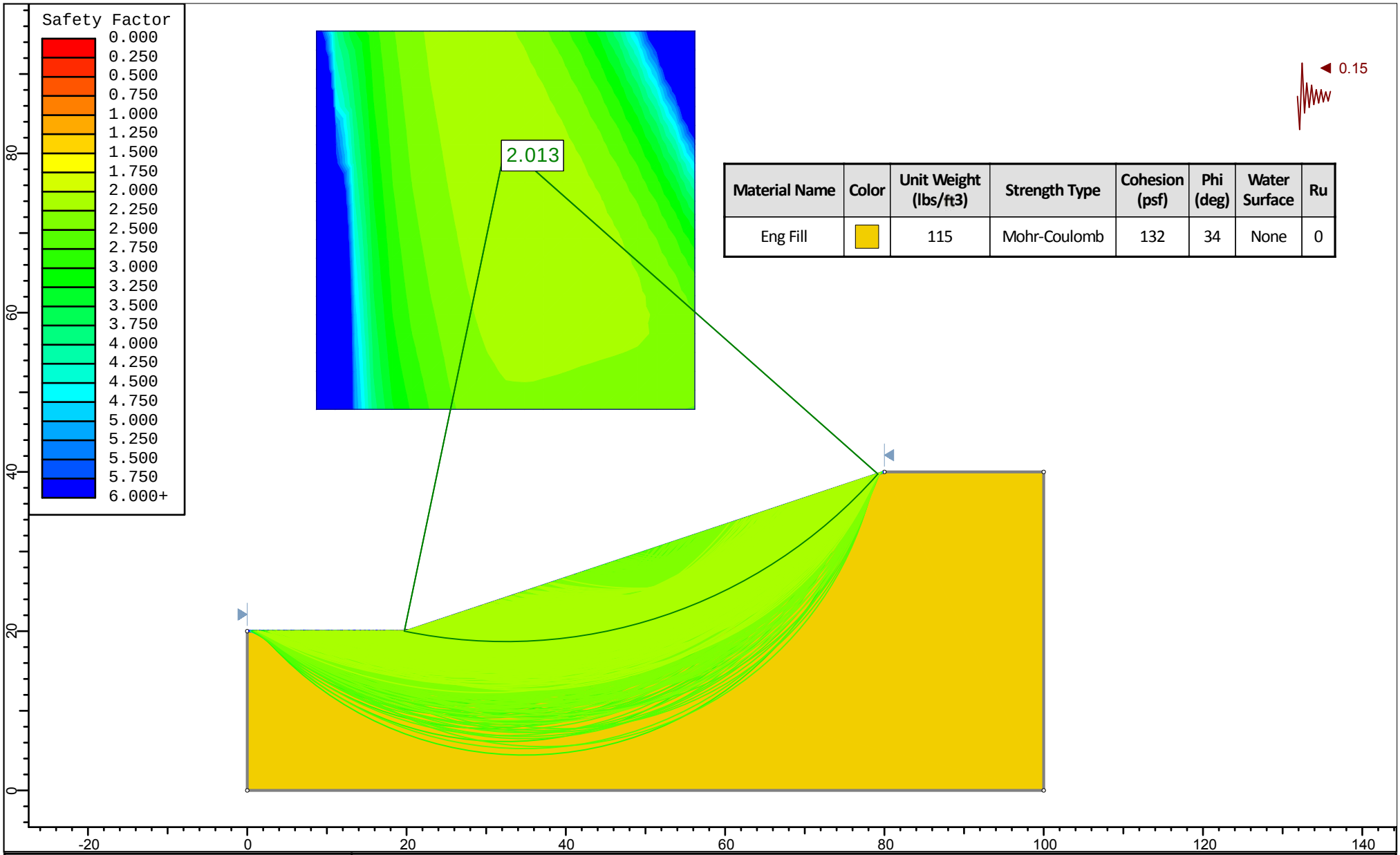


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Eng Fill		115	Mohr-Coulomb	132	34	None	0

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



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 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

Upland Colonies

NOISE IMPACT ANALYSIS

CITY OF UPLAND

PREPARED BY:

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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

LEGEND:

6' Barrier Height (in feet) — Existing Barrier — Recommended Noise Barrier

EXHIBIT ES-B: CONSTRUCTION MITIGATION SUMMARY

LEGEND:

- Receiver Locations
- 6' Existing Barrier Height (in feet)
- Existing Barrier
- Construction Activity
- Distance from receiver to construction activity (in feet)
- 50-foot buffer for large mobile equipment (> 80,000 lbs) and loaded trucks

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

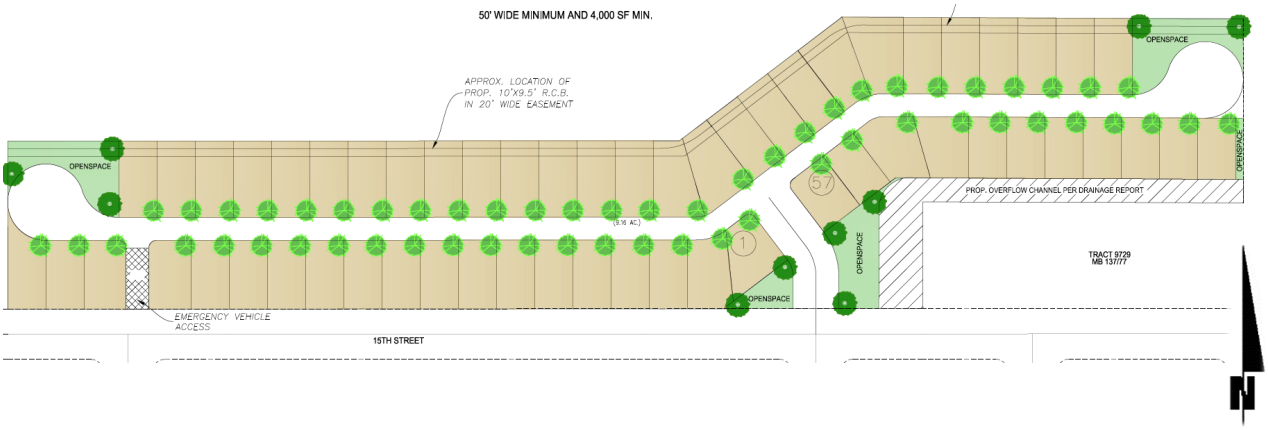
The proposed Upland Colonies Project is located on the north side of 15th Street in the City of Upland, as shown on Exhibit 1-A. The Project site is currently vacant. Land uses surrounding the Project site include a golf course to the north, and residential homes to the south, west, and east. The Interstate 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	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
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

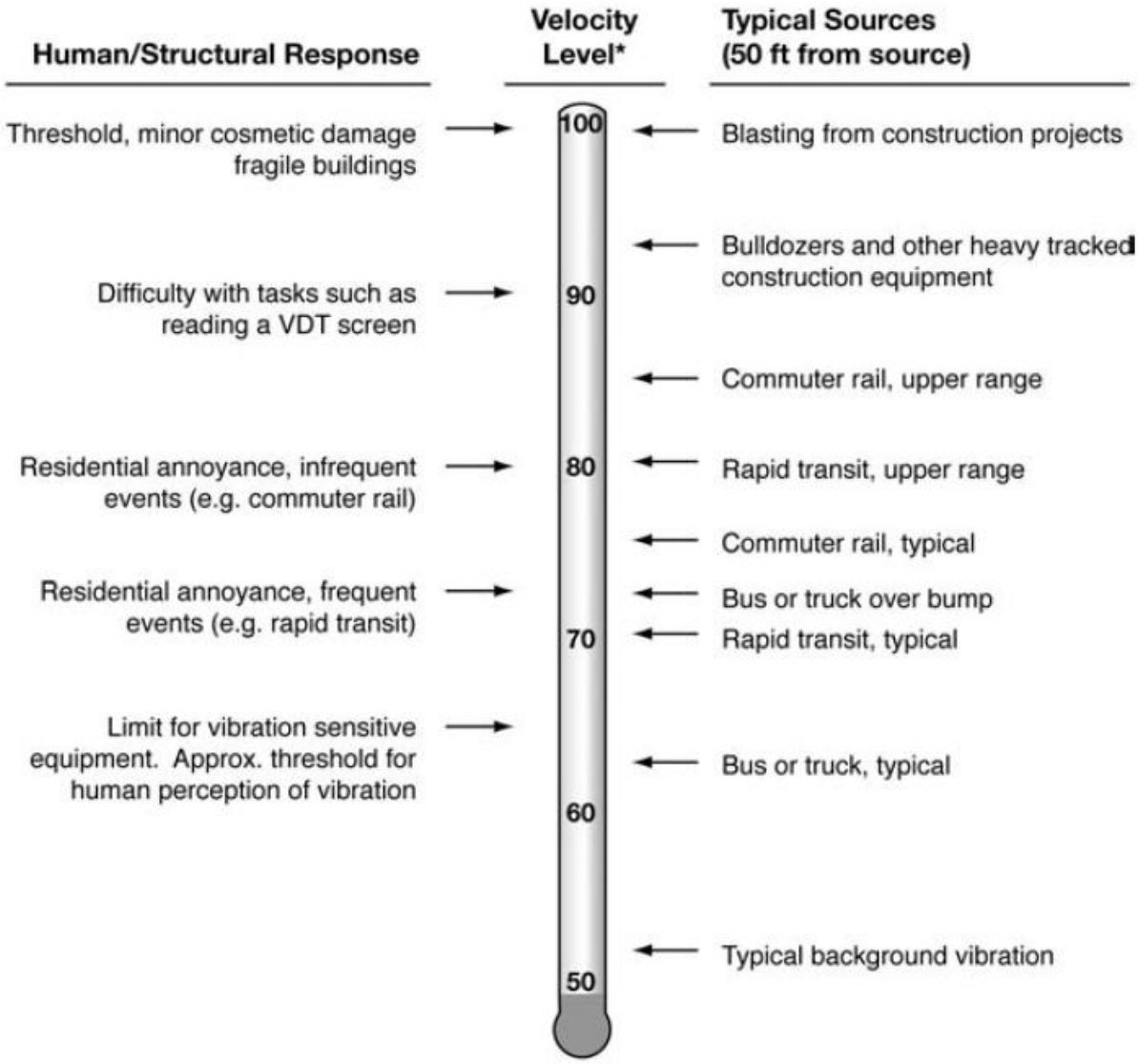
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (11), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural 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



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, 15th 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 15th 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 15th 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 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 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.

EXHIBIT 6-A: RECEIVER LOCATIONS

LEGEND:

- Receiver Locations
- Distance from receiver to Project site boundary (in feet)
- 6' Existing Barrier Height (in feet)
- Existing Barrier

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

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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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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	*Project Name:*	Upland
Road Name:	15th St.	*Job Number:*	11824
Lot No:	0	*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 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 Costa Mesa, CA 92626	2151 E. Convention Center Wy. #222 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 15 % 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.

RIA ALTA / FOOTHILL
RIA 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 July 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

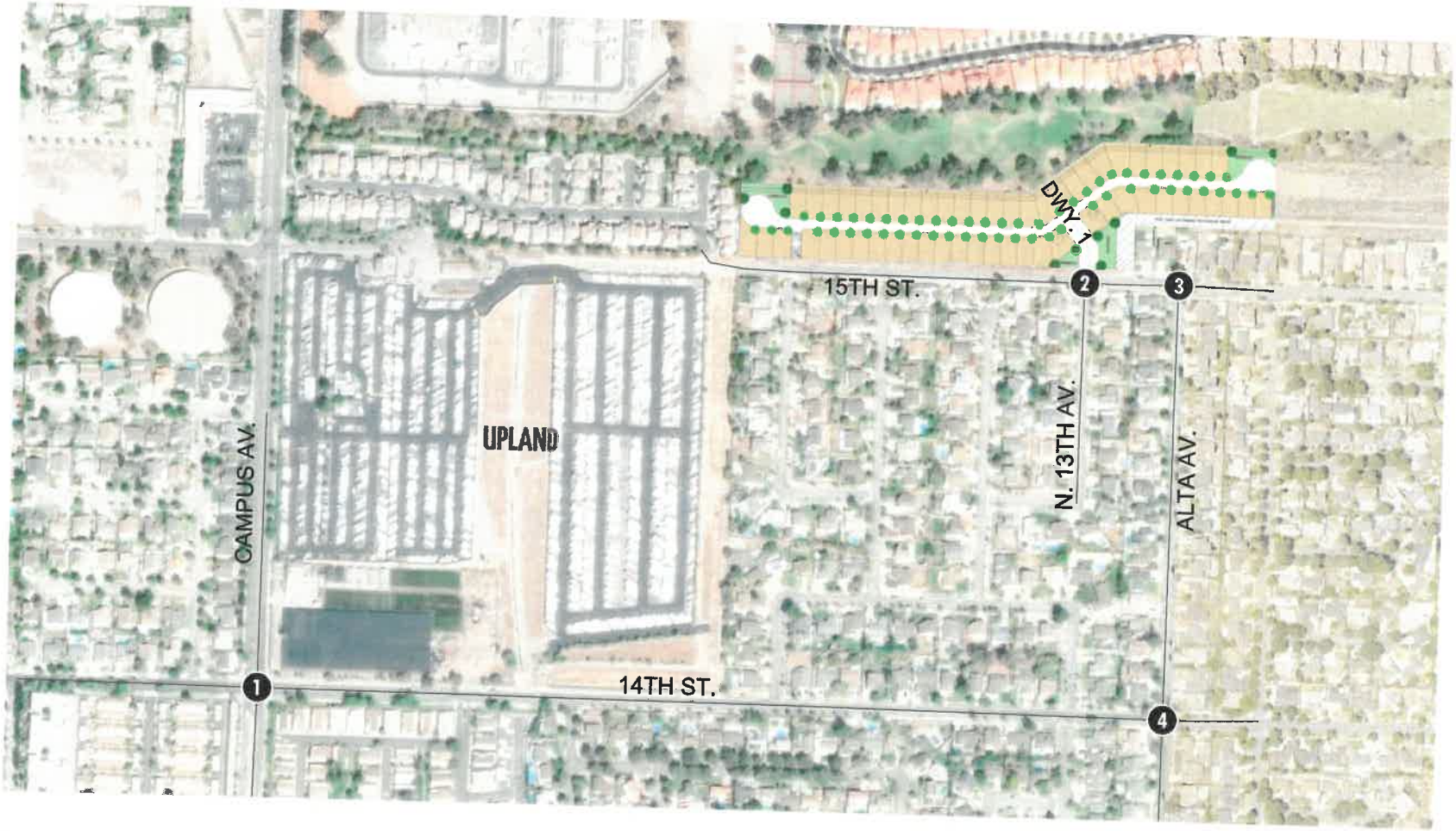
To determine whether the addition of Project traffic at a study intersection results in a significant impact, the following thresholds of significance will be utilized:

- 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

URBAN CROSSROADS

EXHIBIT 3: PROJECT TRIP DISTRIBUTION

LEGEND:

10 = PERCENT TO/FROM PROJECT

N

URBAN CROSSROADS

11822 - trip.dwg

EXHIBIT 1: PRELIMINARY SITE PLAN

11822 - siteplan.dwg

URBAN CROSSROADS

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	PROJECT #:	SC
	NORTH & SOUTH:	Campus	LOCATION #:	1
	EAST & WEST:	14th	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									

Campus

NORTH SIDE

14th WEST SIDE EAST SIDE **14th**

SOUTH SIDE

Campus

		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

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:			
Tue, Jul 17, 18	LOCATION:	Upland	PROJECT #: SC
	NORTH & SOUTH:	13th	LOCATION #: 2
	EAST & WEST:	15th	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					RTOR			
	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	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	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	0	0	0	0	0	0	0
	7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0	1	1	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0
	8:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0
	8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	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	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	1	0	3	0	0	0	0	0	0	4	2	0	10	1	0	0	1	2	0	0	0	0
	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						0	0	0	0
	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	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	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	1	0	1	1	0	3	0	0	0	0	0	0	0	0	0
	4:45 PM	1	0	0	0	0	0	0	2	0	0	1	0	4	1	0	0	0	1	0	0	0	0
	5:00 PM	0	0	1	0	0	0	0	0	0	1	3	0	5	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	1	0	0	0	0	1	1	0	1	0	4	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	1	0	1	2	0	4	0	0	0	0	0	0	0	0	0
	VOLUMES	1	0	2	0	0	0	0	6	1	6	10	0	26	1	0	0	0	1	0	0	0	0
	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						0	0	0	0
	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									

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

T816

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:				
Tue, Jul 17, 18	LOCATION:	Upland	PROJECT #:	SC
	NORTH & SOUTH:	Alta	LOCATION #:	3
	EAST & WEST:	15th	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				U-TURNS					RTOR			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
	LANES:	0	X	0	X	X	X	X	1	0	0	1	X		0	0	0	0		0	0	0	0
AM	7:00 AM	1	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	3	0	0	0	0	1	0	1	0	0	5	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	1	0	0	0	0	0	1	3	0	0	5	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	1	0	0	0	0	1	1	0	3	0	6	0	0	0	0	0	0	0	0	0
	8:15 AM	1	0	2	0	0	0	0	1	0	4	1	0	9	0	0	0	0	0	0	0	0	0
	8:30 AM	1	0	0	0	0	0	0	0	0	2	0	0	3	1	0	0	0	1	0	0	0	0
	8:45 AM	0	0	2	0	0	0	0	0	1	1	0	0	4	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	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	3	0	9	0	0	0	0	3	3	14	4	0	37	1	0	0	0	1	0	0	0	0
	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						0	0	0	0
	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	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	0	0	4	0	0	0	0	0	0	2	1	0	7	0	0	0	0	0	0	0	0	0
	4:15 PM	1	0	3	0	0	0	0	1	0	2	1	0	8	1	0	0	0	1	0	0	0	0
	4:30 PM	1	0	2	0	0	0	0	1	0	2	1	0	7	0	0	0	0	0	0	0	0	0
	4:45 PM	1	0	4	0	0	0	0	2	0	0	2	0	9	1	0	0	0	1	0	0	0	0
	5:00 PM	1	0	0	0	0	0	0	2	0	1	3	0	7	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	1	1	0	1	0	3	0	0	0	0	0	0	0	0	0
	5:30 PM	3	0	3	0	0	0	0	0	0	0	1	0	7	1	0	0	0	1	0	0	0	0
	5:45 PM	1	0	2	0	0	0	0	0	1	1	2	0	7	0	0	0	1	1	0	0	0	0
	VOLUMES	8	0	18	0	0	0	0	7	2	8	12	0	57	3	0	0	1	4	0	0	0	0
	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						0	0	0	0
	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									

Alta

NORTH SIDE

15th WEST SIDE EAST SIDE **15th**

SOUTH SIDE

Alta

		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	1	1	0	2	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	0	0	1	2	1	0	0	1	2	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	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	8:45 AM	0	0	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	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	3	1	1	6	1	3	1	1	6	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	PROJECT #:	SC
	NORTH & SOUTH:	Alta	LOCATION #:	4
	EAST & WEST:	14th	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				U-TURNS					RTOR			
	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	NB 0	SB 0	EB 0	WB 0	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	3	0	0	1	0	3	2	12	2	1	18	1	43	0	0	0	0	0	0	0	0	0
	7:15 AM	2	0	0	0	0	3	1	7	4	1	17	0	35	0	0	0	0	0	0	0	0	0
	7:30 AM	2	3	0	2	0	6	1	17	2	1	20	0	54	0	0	0	0	0	0	0	0	0
	7:45 AM	6	0	0	0	1	4	1	21	5	0	23	1	62	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	2	1	13	7	1	11	0	35	0	0	0	0	0	0	0	0	0
	8:15 AM	3	1	0	1	0	3	4	14	3	0	12	0	41	0	0	0	0	0	0	0	0	0
	8:30 AM	7	2	0	0	2	6	0	9	5	0	18	1	50	1	0	0	0	1	0	0	0	0
	8:45 AM	5	0	0	0	1	2	1	17	15	1	20	0	62	1	0	0	0	1	0	0	0	0
	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	28	6	0	4	4	29	11	110	43	5	139	3	382	2	0	0	0	2	0	0	0	0
	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						0	0	0	0
	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	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	7	1	1	1	0	2	4	23	5	1	26	1	72	0	0	0	0	0	0	0	0	0
	4:15 PM	7	1	0	0	0	4	4	27	4	0	19	1	67	0	0	0	0	0	0	0	0	0
	4:30 PM	5	2	0	0	1	3	5	24	4	0	31	1	76	0	0	0	0	0	0	0	0	0
	4:45 PM	10	3	1	0	0	2	4	33	12	0	23	0	88	0	0	0	0	0	0	0	0	0
	5:00 PM	8	0	0	1	2	4	2	23	8	0	15	0	63	0	0	0	0	0	0	0	0	0
	5:15 PM	6	1	0	1	1	1	4	32	2	0	15	2	65	0	0	0	0	0	0	0	0	0
	5:30 PM	6	2	1	1	1	2	6	32	4	0	23	0	78	0	0	0	0	0	0	0	0	0
	5:45 PM	7	2	0	0	2	1	3	29	10	1	22	1	78	0	0	0	0	0	0	0	0	0
	VOLUMES	56	12	3	4	7	19	32	223	49	2	174	6	587	0	0	0	0	0	0	0	0	0
	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						0	0	0	0
	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									

Alta

NORTH SIDE

14th WEST SIDE

EAST SIDE **14th**

SOUTH SIDE

Alta

		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	2	0	0	0	2	2	0	0	0	2	0	0	0	0	0
	7:15 AM	1	1	0	1	3	1	1	0	1	3	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	1	0	21	1	23	1	0	21	1	23	0	0	0	0	0
	8:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	8:15 AM	1	0	1	3	5	1	0	1	2	4	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	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	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	1	22	6	34	5	1	22	4	32	0	0	0	2	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	0	0	1	1	2	0	0	1	0	1	0	0	0	1	1
	4:15 PM	0	0	0	1	1	0	0	0	1	1	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	2	0	2	0	0	2	0	2	0	0	0	0	0
	5:00 PM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
	5:15 PM	0	2	1	0	3	0	2	1	0	3	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	2	6	2	10	0	2	6	1	9	0	0	0	1	1

INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Upland	PROJECT #:	SC
Tue, Jul 17, 18	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				U-TURNS					RTOR			
	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	NB 0	SB 0	EB 0	WB 0	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	2	0	1	4	0	5	9	74	1	0	109	5	210	0	0	1	0	1	0	2	0	1
AM	7:15 AM	1	1	0	2	1	12	5	98	0	3	152	5	280	0	0	0	1	1	0	10	0	0
AM	7:30 AM	2	0	0	7	0	8	12	116	4	0	199	3	351	0	0	1	0	1	0	5	1	0
AM	7:45 AM	1	0	1	5	0	9	11	145	7	6	225	9	419	0	1	0	0	1	0	2	1	1
AM	8:00 AM	1	2	1	6	1	4	16	131	3	1	182	10	358	0	0	0	0	0	0	2	0	1
AM	8:15 AM	3	3	2	6	3	19	24	115	6	4	162	12	359	0	0	1	0	1	1	11	1	3
AM	8:30 AM	6	1	1	6	4	12	16	133	4	2	162	14	361	0	0	0	0	0	1	4	1	3
AM	8:45 AM	2	0	1	5	4	13	12	134	2	2	191	8	374	0	0	0	0	0	0	8	0	1
AM	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
AM	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
AM	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
AM	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
AM	VOLUMES	18	7	7	41	13	82	105	946	27	18	1,382	66	2,712	0	1	3	1	5	2	44	4	10
AM	APPROACH %	56%	22%	22%	30%	10%	60%	10%	88%	3%	1%	94%	5%										
AM	APP/DEPART	32	/	176	136	/	57	1,078	/	994	1,466	/	1,485	0									
AM	BEGIN PEAK HR		7:45 AM																				
AM	VOLUMES	11	6	5	23	8	44	67	524	20	13	731	45	1,497						2	19	3	8
AM	APPROACH %	50%	27%	23%	31%	11%	59%	11%	86%	3%	2%	93%	6%										
AM	PEAK HR FACTOR		0.688			0.670			0.937			0.822		0.893									
AM	APP/DEPART	22	/	118	75	/	41	611	/	551	789	/	787	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
PM	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
PM	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
PM	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
PM	4:00 PM	5	4	6	13	2	19	22	259	3	1	203	5	542	0	0	0	0	0	3	12	0	0
PM	4:15 PM	3	3	4	15	2	19	20	269	6	5	175	13	534	0	0	0	2	2	3	9	1	2
PM	4:30 PM	2	1	4	19	3	22	16	314	4	3	216	9	613	0	0	0	1	1	2	14	1	1
PM	4:45 PM	3	3	6	11	0	20	21	315	5	2	191	4	581	0	0	0	1	1	4	13	0	2
PM	5:00 PM	7	4	4	22	6	34	22	350	3	7	205	3	667	0	0	0	3	3	1	16	0	0
PM	5:15 PM	1	1	4	10	2	15	20	340	6	3	226	10	638	0	0	0	2	2	4	10	0	1
PM	5:30 PM	6	10	4	16	3	15	27	301	2	3	217	7	611	0	0	0	2	2	2	10	0	2
PM	5:45 PM	4	1	1	15	2	20	12	303	3	2	212	7	582	0	2	0	1	3	1	6	0	1
PM	VOLUMES	31	27	33	121	20	164	160	2,451	32	26	1,645	58	4,768	0	2	0	12	14	20	90	2	9
PM	APPROACH %	34%	30%	36%	40%	7%	54%	6%	93%	1%	2%	95%	3%										
PM	APP/DEPART	91	/	247	305	/	66	2,643	/	2,615	1,729	/	1,840	0									
PM	BEGIN PEAK HR		4:30 PM																				
PM	VOLUMES	13	9	18	62	11	91	79	1,319	18	15	838	26	2,499						11	53	1	4
PM	APPROACH %	33%	23%	45%	38%	7%	55%	6%	93%	1%	2%	95%	3%										
PM	PEAK HR FACTOR		0.667			0.661			0.944			0.919		0.937									
PM	APP/DEPART	40	/	114	164	/	37	1,416	/	1,406	879	/	942	0									

Alta

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Alta

		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	0	1	2	0	1	0	1	2	0	0	0	0	0
AM	7:15 AM	2	1	1	0	4	2	1	1	0	4	0	0	0	0	0
AM	7:30 AM	2	1	0	2	5	2	1	0	2	5	0	0	0	0	0
AM	7:45 AM	1	2	5	2	10	1	1	4	2	8	0	1	1	0	2
AM	8:00 AM	0	1	2	3	6	0	1	2	3	6	0	0	0	0	0
AM	8:15 AM	1	0	1	0	2	1	0	0	0	1	0	0	1	0	1
AM	8:30 AM	2	1	2	1	6	2	1	2	1	6	0	0	0	0	0
AM	8:45 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	TOTAL	8	7	11	10	36	8	6	9	10	33	0	1	2	0	3
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	2	0	2	0	0	1	0	1	0	0	1	0	1
PM	4:15 PM	5	2	3	3	13	4	1	2	3	10	1	1	1	0	3
PM	4:30 PM	1	0	0	2	3	1	0	0	2	3	0	0	0	0	0
PM	4:45 PM	5	4	7	4	20	5	4	6	4	19	0	0	1	0	1
PM	5:00 PM	1	3	1	2	7	1	3	0	2	6	0	0	1	0	1
PM	5:15 PM	4	0	3	3	10	4	0	3	3	10	0	0	0	0	0
PM	5:30 PM	1	1	3	1	6	1	1	3	1	6	0	0	0	0	0
PM	5:45 PM	4	1	3	0	8	4	1	1	0	6	0	0	2	0	2
PM	TOTAL	21	11	22	15	69	20	10	16	15	61	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:	NOTES:
PASSENGER VEHICLES	

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	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
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	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
7:00 AM	0	0	1	0	1
7:15 AM	0	0	0	1	1
7:30 AM	0	0	1	0	1
7:45 AM	0	1	0	0	1
8:00 AM	0	0	0	0	0
8:15 AM	0	0	1	0	1
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
VOLUMES	0	1	3	1	5
03:00 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	2	2
4:30 PM	0	0	0	1	1
4:45 PM	0	0	0	1	1
5:00 PM	0	0	0	3	3
5:15 PM	0	0	0	2	2
5:30 PM	0	0	0	2	2
5:45 PM	0	2	0	1	3
VOLUMES	0	2	0	12	14

RTOR

	NRR	SRR	ERR	WRR
7:00 AM	0	2	0	1
7:15 AM	0	8	0	0
7:30 AM	0	5	1	0
7:45 AM	0	2	1	1
8:00 AM	0	2	0	1
8:15 AM	1	11	1	3
8:30 AM	1	3	1	3
8:45 AM	0	8	0	1
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
VOLUMES	2	41	4	10
PEAK HR	2	18	3	8
03:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	0	0	0	0
4:00 PM	3	12	0	0
4:15 PM	3	9	0	2
4:30 PM	2	13	1	1
4:45 PM	3	13	0	2
5:00 PM	1	16	0	0
5:15 PM	4	10	0	1
5:30 PM	2	10	0	2
5:45 PM	1	6	0	1
VOLUMES	19	89	1	9
PEAK HR	8	42	0	4

Alta

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Alta

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:	NOTES:
2-AXLE WORK VEHICLES/ TRUCKS	

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

	NORTHBOUND Alta			SOUTHBOUND Alta			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS					RTOR			
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	NB	SB	EB	WB	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM																						
7:00 AM	0	0	0	0	0	0	0	4	0	0	2	0	6	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	1	1	3	0	0	3	0	8	0	0	0	0	0	0	1	0	0
7:30 AM	0	0	0	0	0	0	0	5	0	0	2	0	7	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	1	0	0	0	6	0	0	7	0	14	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	7	0	0	3	0	10	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	2	1	9	0	0	3	0	15	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	1	1	1	9	0	0	4	0	16	0	0	0	0	0	0	1	0	0
8:45 AM	0	0	0	0	0	1	0	6	1	0	9	0	17	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	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	0	0	0	1	1	5	3	49	1	0	33	0	93	0	0	0	0	0	0	2	0	0
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						0	1	0	0
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	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	1	0	0	0	0	0	2	3	0	0	3	0	9	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	2	0	0	1	5	1	0	3	0	12	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	2	0	1	0	3	0	0	7	0	13	0	0	0	0	0	0	1	0	0
4:45 PM	0	0	1	0	0	0	0	13	0	0	2	0	16	0	0	0	0	0	1	0	0	0
5:00 PM	0	0	0	0	0	0	1	5	0	0	5	0	11	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	4	0	0	6	0	11	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	7	0	0	5	0	12	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	10	1	0	6	2	19	0	0	0	0	0	0	0	0	0
VOLUMES	1	0	1	4	0	2	4	50	2	0	37	2	103	0	0	0	0	0	1	1	1	0
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						0	0	0	0
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									

Alta

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Alta

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			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	1	2	0	1	2	0	
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	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
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	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
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
VOLUMES	0	0	0	0	0
03:00 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
VOLUMES	0	0	0	0	0

RTOR

	NRR	SRR	ERR	WRR
LANES:	0	0	0	0
7:00 AM	0	0	0	0
7:15 AM	0	1	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
VOLUMES	0	1	0	0
PEAK HR VOLUMES	0	0	0	0
03:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	0	0	0	0
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
VOLUMES	0	0	0	0
PEAK HR VOLUMES	0	0	0	0

Alta

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Alta

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:	NOTES:
4 OR MORE AXLE TRUCKS	

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

	NORTHBOUND Alta			SOUTHBOUND Alta			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS					RTOR			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
LANES:	0	2	0	0	2	0	1	2	0	1	2	0							0	0	0	0
AM																						
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	4	0	0	3	0	7	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	2	0	0	1	0	3	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	3	0	0	3	0	6	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	3	0	0	1	0	5	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	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	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	0	0	0	0	0	1	0	16	0	0	10	0	27	0	0	0	0	0	0	0	0	0
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						0	0	0	0
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									
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	0	0	0	0	0	0	0	0	0	0	1	0	1	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	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	2	0	3	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	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	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	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	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	2	0	0	5	0	7	0	0	0	0	0	0	0	0	0
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						0	0	0	0
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									

Alta

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Alta

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:	NOTES:	AM / PM / MD / OTHER / OTHER	▲ N ◄ W E ► S ▼
RV			

	NORTHBOUND Alta			SOUTHBOUND Alta			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	1	2	0	1	2	0	
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					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	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
					0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
					0	0	0	0

Alta

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Alta

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				U-TURNS					RTOR			
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	NB	SB	EB	WB	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM																						
7:00 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	3	0	0	2	0	5	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	2	0	0	2	0	4	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	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	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	0	0	0	0	0	0	0	11	0	0	9	0	20	0	0	0	0	0	0	0	0	0
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						0	0	0	0
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	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	0	0	0	0	0	0	0	1	0	0	2	0	3	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	3	0	0	2	0	5	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	3	0	0	2	0	5	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	12	0	0	10	0	22	0	0	0	0	0	0	0	0	0
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						0	0	0	0
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									

Alta

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Alta

INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Upland	PROJECT #:	SC
Tue, Jul 17, 18	NORTH & SOUTH:	Grove	LOCATION #:	6
	EAST & WEST:	Foothill	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				U-TURNS					RTOR			
	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	NB 0	SB 0	EB 0	WB 0	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	19	19	8	8	12	2	2	44	21	9	117	10	271	0	0	0	0	0	6	2	3	2
AM	7:15 AM	27	11	12	12	19	6	0	77	22	11	134	11	342	0	0	0	0	0	7	4	4	0
AM	7:30 AM	27	14	12	16	25	5	4	83	26	21	177	8	418	0	0	1	1	2	6	4	4	0
AM	7:45 AM	41	20	10	23	18	1	2	107	39	18	189	3	471	0	0	1	0	1	4	1	9	0
AM	8:00 AM	42	17	13	13	15	5	3	96	24	17	153	23	421	0	0	0	0	0	9	4	3	6
AM	8:15 AM	34	18	11	15	22	2	3	85	32	17	146	23	408	0	0	1	0	1	8	2	6	2
AM	8:30 AM	47	21	15	12	21	4	2	90	33	15	142	15	417	0	0	1	0	1	9	2	8	3
AM	8:45 AM	44	26	16	16	30	4	1	98	33	21	141	16	446	0	0	0	0	0	10	3	8	4
AM	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
AM	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
AM	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
AM	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
AM	VOLUMES	281	146	97	115	162	29	17	680	230	129	1,199	109	3,194	0	0	4	1	5	59	22	45	17
AM	APPROACH %	54%	28%	19%	38%	53%	9%	2%	73%	25%	9%	83%	8%										
AM	APP/DEPART	524	/	268	306	/	520	927	/	893	1,437	/	1,513	0									
AM	BEGIN PEAK HR		7:30 AM																				
AM	VOLUMES	144	69	46	67	80	13	12	371	121	73	665	57	1,718						27	11	22	8
AM	APPROACH %	56%	27%	18%	42%	50%	8%	2%	74%	24%	9%	84%	7%										
AM	PEAK HR FACTOR		0.899			0.870			0.851			0.946		0.912									
AM	APP/DEPART	259	/	135	160	/	273	504	/	485	795	/	825	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
PM	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
PM	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
PM	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
PM	4:00 PM	40	42	43	35	40	3	3	219	46	20	152	16	659	0	0	0	0	0	21	3	17	3
PM	4:15 PM	51	38	37	38	41	1	7	212	45	21	141	29	661	0	0	1	1	2	11	1	13	5
PM	4:30 PM	39	35	47	23	33	3	12	258	49	18	180	26	723	0	0	2	0	2	27	2	8	3
PM	4:45 PM	49	41	55	41	30	8	2	284	38	23	147	20	738	0	0	0	1	1	21	2	14	5
PM	5:00 PM	44	38	48	42	38	6	5	297	62	23	185	21	809	0	0	3	1	4	13	4	8	7
PM	5:15 PM	47	42	39	43	33	4	5	269	57	10	189	20	758	0	0	0	0	0	9	4	9	4
PM	5:30 PM	52	52	29	37	39	1	6	245	49	11	163	13	697	0	0	2	0	2	19	1	16	3
PM	5:45 PM	43	44	30	36	33	3	5	259	44	14	192	21	724	0	0	4	0	4	12	2	13	6
PM	VOLUMES	365	332	328	295	287	29	45	2,043	390	140	1,349	166	5,769	0	0	12	3	15	133	19	98	36
PM	APPROACH %	36%	32%	32%	48%	47%	5%	2%	82%	16%	8%	82%	10%										
PM	APP/DEPART	1,025	/	531	611	/	814	2,478	/	2,669	1,655	/	1,755	0									
PM	BEGIN PEAK HR		4:30 PM																				
PM	VOLUMES	179	156	189	149	134	21	24	1,108	206	74	701	87	3,028						70	12	39	19
PM	APPROACH %	34%	30%	36%	49%	44%	7%	2%	83%	15%	9%	81%	10%										
PM	PEAK HR FACTOR		0.903			0.884			0.919			0.941		0.936									
PM	APP/DEPART	524	/	262	304	/	412	1,338	/	1,448	862	/	906	0									

Grove

NORTH SIDE

Foothill WEST SIDE EAST SIDE **Foothill**

SOUTH SIDE

Grove

		ALL PED AND BIKE					PEDESTRIAN 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	4	0	0	4	0	4	0	0	4	0	0	0	0	0
AM	7:15 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
AM	7:30 AM	1	3	1	1	6	0	3	1	0	4	1	0	0	1	2
AM	7:45 AM	0	18	4	2	24	0	18	4	2	24	0	0	0	0	0
AM	8:00 AM	0	9	1	0	10	0	9	1	0	10	0	0	0	0	0
AM	8:15 AM	1	3	1	0	5	1	3	1	0	5	0	0	0	0	0
AM	8:30 AM	0	4	3	0	7	0	3	3	0	6	0	1	0	0	1
AM	8:45 AM	0	2	2	0	4	0	2	2	0	4	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	TOTAL	2	44	12	3	61	1	43	12	2	58	1	1	0	1	3
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	7	5	0	12	0	7	4	0	11	0	0	1	0	1
PM	4:15 PM	0	5	2	2	9	0	5	2	1	8	0	0	0	1	1
PM	4:30 PM	0	5	0	0	5	0	4	0	0	4	0	1	0	0	1
PM	4:45 PM	0	2	3	1	6	0	2	2	1	5	0	0	1	0	1
PM	5:00 PM	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0
PM	5:15 PM	0	7	2	2	11	0	7	1	1	9	0	0	1	1	2
PM	5:30 PM	0	6	1	0	7	0	5	1	0	6	0	1	0	0	1
PM	5:45 PM	0	4	1	0	5	0	4	0	0	4	0	0	1	0	1
PM	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:	LOCATION:	Upland	PROJECT #:	SC
7/17/18	NORTH & SOUTH:	Grove	LOCATION #:	6
TUESDAY	EAST & WEST:	Foothill	CONTROL:	SIGNAL

CLASS 1:	NOTES:
PASSENGER VEHICLES	

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

		NORTHBOUND Grove			SOUTHBOUND Grove			EASTBOUND Foothill			WESTBOUND Foothill				U-TURNS					RTOR			
	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	NB	SB	EB	WB	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	18	16	7	8	12	2	2	41	19	9	113	10	257	0	0	0	0	0	5	2	3	2
	7:15 AM	25	9	10	12	19	6	0	71	20	11	129	8	320	0	0	0	0	0	5	4	3	0
	7:30 AM	27	13	11	13	25	4	4	76	24	20	173	6	396	0	0	1	0	1	6	3	4	0
	7:45 AM	33	19	9	22	17	1	2	100	36	18	182	3	442	0	0	1	0	1	3	1	7	0
	8:00 AM	38	17	12	13	14	5	1	85	24	16	146	21	392	0	0	0	0	0	8	4	3	6
	8:15 AM	33	17	8	15	22	2	3	78	29	17	140	22	386	0	0	1	0	1	6	2	6	2
	8:30 AM	45	20	14	11	21	4	1	82	28	13	138	15	392	0	0	1	0	1	8	2	8	3
	8:45 AM	42	24	15	15	27	4	1	89	32	20	132	15	416	0	0	0	0	0	9	3	8	3
	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	261	135	86	109	157	28	14	622	212	124	1,153	100	3,001	0	0	4	0	4	50	21	42	16
	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						23	10	20	8
	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									
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	40	41	41	34	39	3	3	213	44	19	151	16	644	0	0	0	0	0	21	3	16	3
	4:15 PM	50	38	34	38	40	1	7	206	42	19	137	29	641	0	0	1	1	2	10	1	12	5
	4:30 PM	36	34	46	22	31	2	11	253	46	16	176	25	698	0	0	2	0	2	26	2	8	3
	4:45 PM	49	41	54	39	28	7	2	272	33	23	143	20	711	0	0	0	1	1	21	1	12	5
	5:00 PM	43	37	47	42	37	6	5	293	59	22	179	20	790	0	0	3	1	4	12	4	7	7
	5:15 PM	45	42	39	42	33	4	5	261	55	10	185	20	741	0	0	0	0	0	9	4	9	4
	5:30 PM	49	52	29	37	39	1	6	241	47	10	160	13	684	0	0	2	0	2	19	1	16	3
	5:45 PM	41	42	30	36	31	3	5	253	42	13	184	21	701	0	0	4	0	4	12	2	13	6
	VOLUMES	353	327	320	290	278	27	44	1,992	368	132	1,315	164	5,610	0	0	12	3	15	130	18	93	36
	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						68	11	36	19
	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									

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:	NOTES:	AM	▲ N
2-AXLE		PM	◄ W E ►
WORK		MD	
VEHICLES/		OTHER	S
TRUCKS		OTHER	▼

	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					RTOR			
	NB	SB	EB	WB	TTL	NRR 0	SRR 0	ERR 0	WRR 0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	2	0	1	0
7:30 AM	0	0	0	1	1	0	1	0	0
7:45 AM	0	0	0	0	0	1	0	0	0
8:00 AM	0	0	0	0	0	1	0	0	0
8:15 AM	0	0	0	0	0	1	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	1	1	5	1	1	0
PEAK HR VOLUMES						2	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	1	0
4:15 PM	0	0	0	0	0	1	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0
5:00 PM	0	0	0	0	0	1	0	1	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	2	0	4	0
PEAK HR VOLUMES						2	0	3	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 3: 3-AXLE TRUCKS

NOTES:

AM PM MD OTHER OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Grove			SOUTHBOUND Grove			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	2	1	1	2	1	1	2	0	
AM													
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
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	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					RTOR			
	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
LANES:						0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	1	0	0	0
8:30 AM	0	0	0	0	0	1	0	0	0
8:45 AM	0	0	0	0	0	1	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	3	0	0	1
PEAK HR VOLUMES						0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	1	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	1	0	0	0
PEAK HR VOLUMES						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				U-TURNS					RTOR			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
	LANES:	1	1	1	1	2	1	1	2	1	1	2	0							0	0	0	0
AM	7:00 AM	1	0	1	0	0	0	0	1	0	0	0	0	3	0	0	0	0	0	1	0	0	0
AM	7:15 AM	2	0	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
AM	7:45 AM	2	0	0	0	0	0	0	1	2	0	1	0	6	0	0	0	0	0	0	0	2	0
AM	8:00 AM	1	0	0	0	0	0	1	2	0	0	2	0	6	0	0	0	0	0	0	0	0	0
AM	8:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AM	8:30 AM	1	0	0	0	0	0	0	2	1	1	0	0	5	0	0	0	0	0	0	0	0	0
AM	8:45 AM	0	1	0	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0	0	0	0	0
AM	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
AM	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
AM	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
AM	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
AM	VOLUMES	8	1	1	0	0	0	1	11	3	1	4	0	30	0	0	0	0	0	1	0	2	0
AM	APPROACH %	80%	10%	10%	0%	0%	0%	7%	73%	20%	20%	80%	0%										
AM	APP/DEPART	10	/	2	0	/	4	15	/	12	5	/	12	0									
AM	BEGIN PEAK HR		7:15 AM																				
AM	VOLUMES	5	0	0	0	0	0	1	5	3	1	3	0	18						0	0	2	0
AM	APPROACH %	100%	0%	0%	0%	0%	0%	11%	56%	33%	25%	75%	0%										
AM	PEAK HR FACTOR		0.625			0.000			0.750			0.500		0.750									
AM	APP/DEPART	5	/	1	0	/	4	9	/	5	4	/	8	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
PM	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
PM	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
PM	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
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	1	0	0	0	0	1	0	1	1	0	1	0	5	0	0	0	0	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:45 PM	0	0	0	0	1	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0
PM	VOLUMES	1	0	0	0	1	1	0	2	1	0	3	0	9	0	0	0	0	0	0	0	0	0
PM	APPROACH %	100%	0%	0%	0%	50%	50%	0%	67%	33%	0%	100%	0%										
PM	APP/DEPART	1	/	0	2	/	2	3	/	2	3	/	5	0									
PM	BEGIN PEAK HR		4:00 PM																				
PM	VOLUMES	1	0	0	0	0	1	0	2	1	0	1	0	6						0	0	0	0
PM	APPROACH %	100%	0%	0%	0%	0%	100%	0%	67%	33%	0%	100%	0%										
PM	PEAK HR FACTOR		0.250			0.250			0.375			0.250		0.300									
PM	APP/DEPART	1	/	0	1	/	1	3	/	2	1	/	3	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 5:	NOTES:	AM / PM / MD / OTHER / OTHER	▲ N ◄ W E ► S ▼
RV			

	NORTHBOUND Grove			SOUTHBOUND Grove			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	2	1	1	2	1	1	2	0	
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
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
VOLUMES	0	0	0	0	0
03:00 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
VOLUMES	0	0	0	0	0

RTOR

	NRR	SRR	ERR	WRR
LANES	0	0	0	0
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
VOLUMES	0	0	0	0
PEAK HR VOLUMES	0	0	0	0
03:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	0	0	0	0
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
VOLUMES	0	0	0	0
PEAK HR VOLUMES	0	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 6:	NOTES:	AM / PM / MD / OTHER / OTHER	▲ N ◄ W E ► S ▼
BUSES			

	NORTHBOUND Grove			SOUTHBOUND Grove			EASTBOUND Foothill			WESTBOUND Foothill			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	1	2	1	1	2	1	1	2	0	
AM 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
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	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					RTOR			
	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
LANES:						0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0
AM PEAK HR VOLUMES						0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	1	1	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	1	1	0
PM PEAK HR VOLUMES						0	1	1	0

Grove

NORTH SIDE

Foothill WEST SIDE

EAST SIDE **Foothill**

SOUTH SIDE

Grove

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

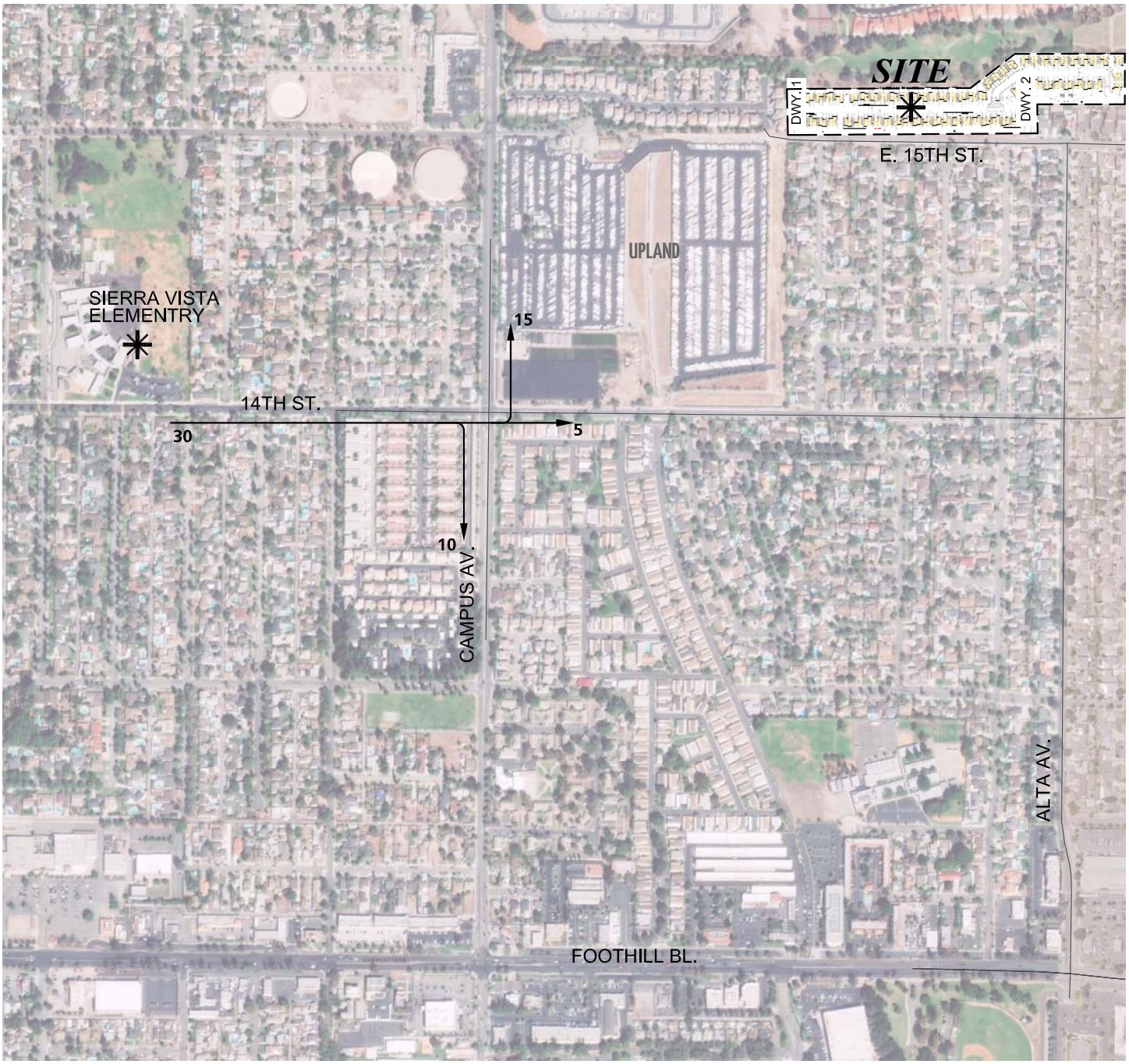
Land Use	ITE LU Code	Units[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Trip Generation Rates[1]									
Elementary School	520	STU	0.36	0.31	0.67	0.08	0.09	0.17	1.89
Middle/Junior High School	522	STU	0.31	0.27	0.58	0.08	0.09	0.17	2.13
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:

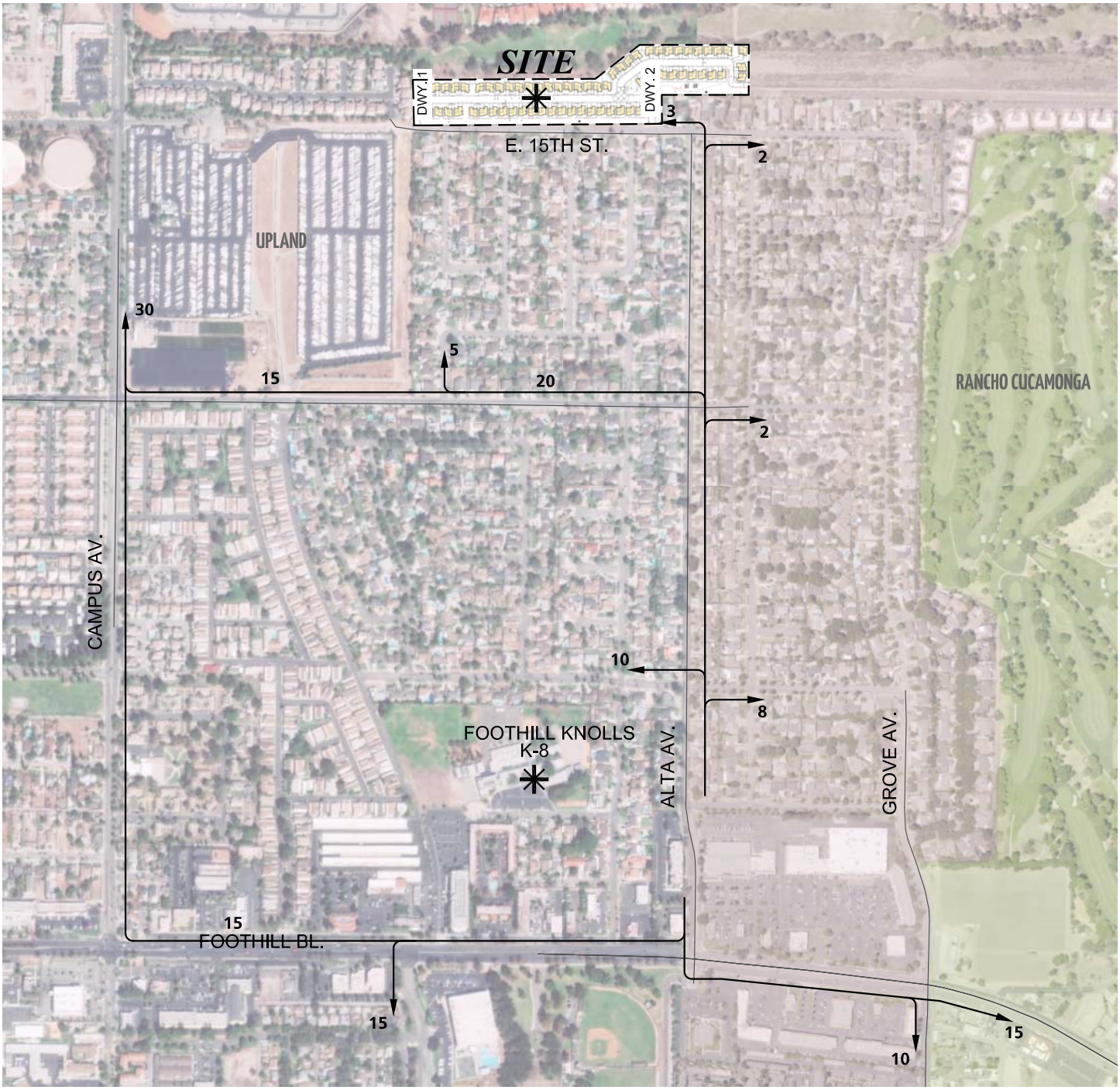
10 = PERCENT TO/FROM SCHOOL

N

11822 - trip_int.dwg

URBAN CROSSROADS

EXHIBIT 3.2-2



LEGEND:

10 = PERCENT TO/FROM SCHOOL

N

EXHIBIT 3.2-3

LEGEND:

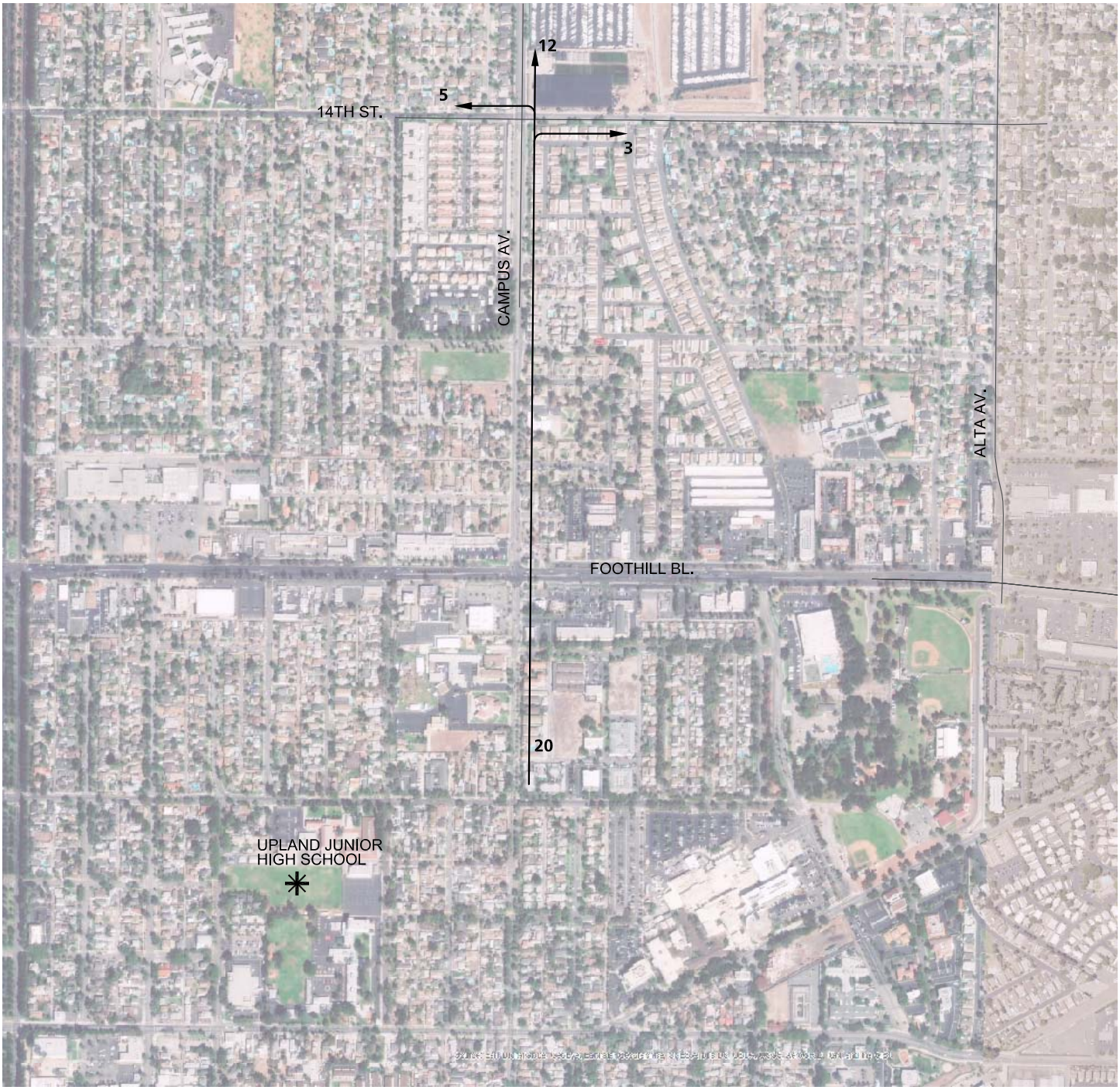
10 = PERCENT TO/FROM SCHOOL

N

11822 - trip_int.dwg

URBAN CROSSROADS

EXHIBIT 3.2-4

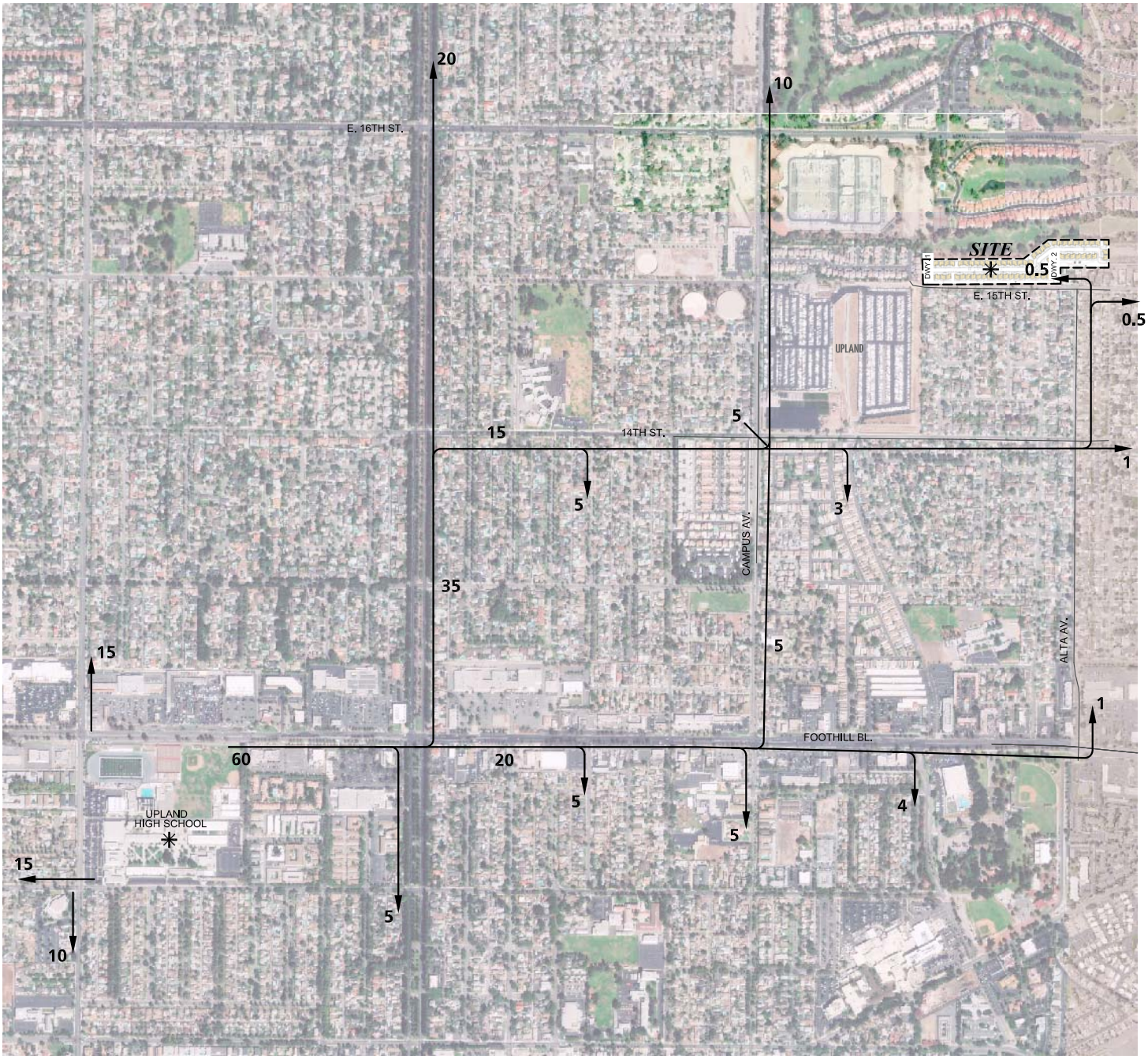


LEGEND:

10 = PERCENT TO/FROM SCHOOL

N

EXHIBIT 3.2-5



LEGEND:

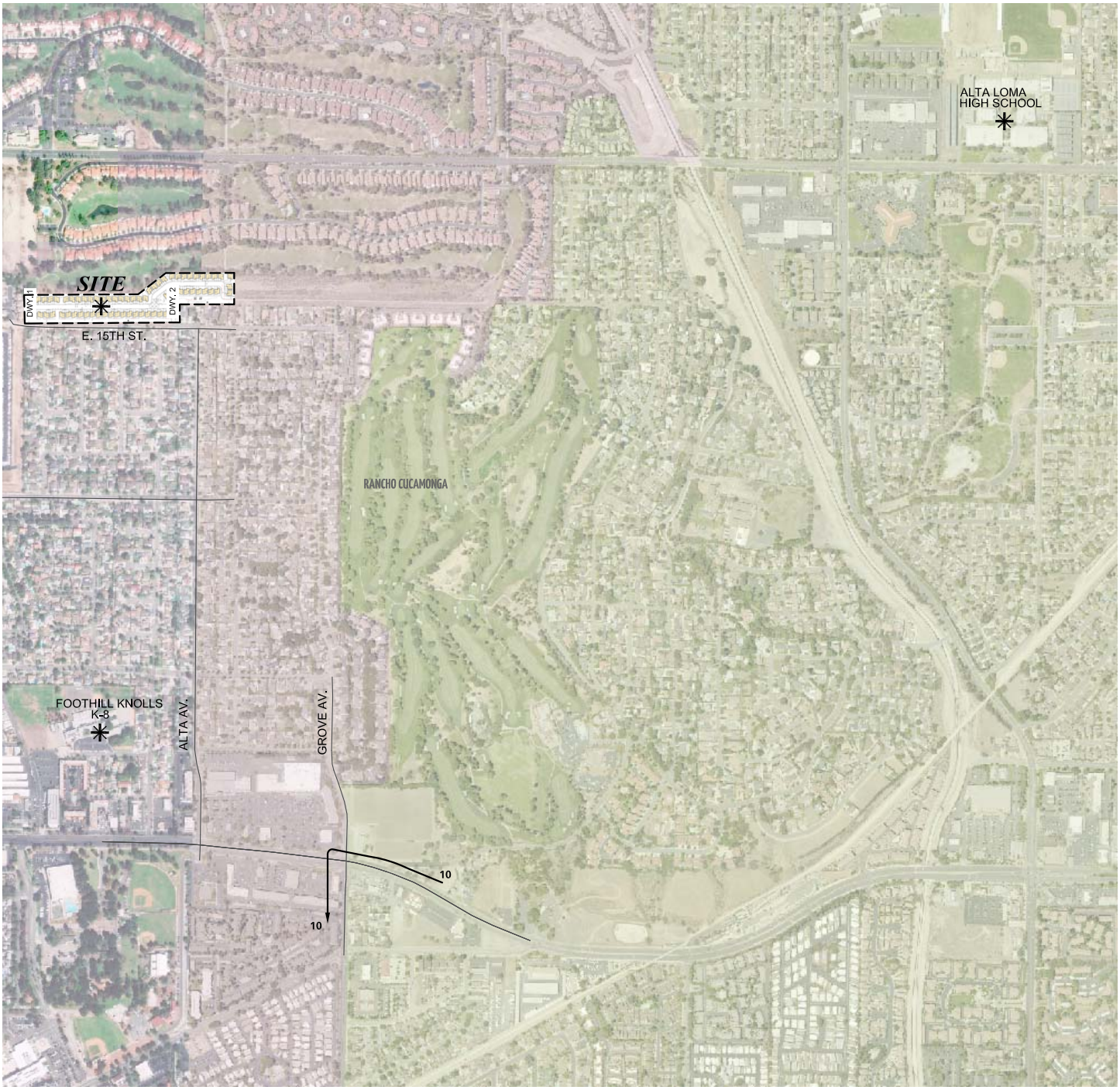
10 = PERCENT TO/FROM SCHOOL

N

11822 - trip_int.dwg

URBAN CROSSROADS

EXHIBIT 3.2-6



LEGEND:

10 = PERCENT TO/FROM SCHOOL

N

11822 - trip_int.dwg

URBAN CROSSROADS

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APPENDIX 3.3:

EXISTING (2018) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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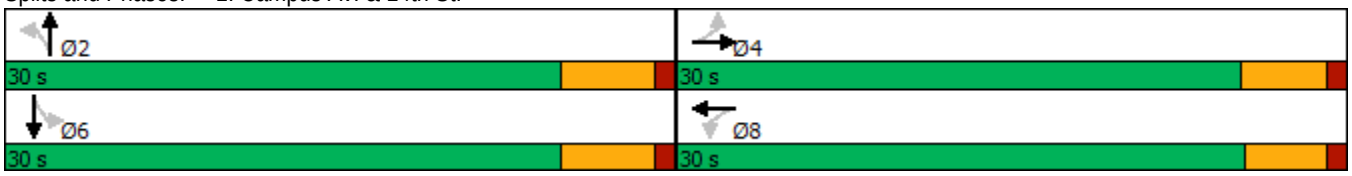
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	73	65	38	129	32	413	111	588
Future Volume (vph)	73	65	38	129	32	413	111	588
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch 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	-

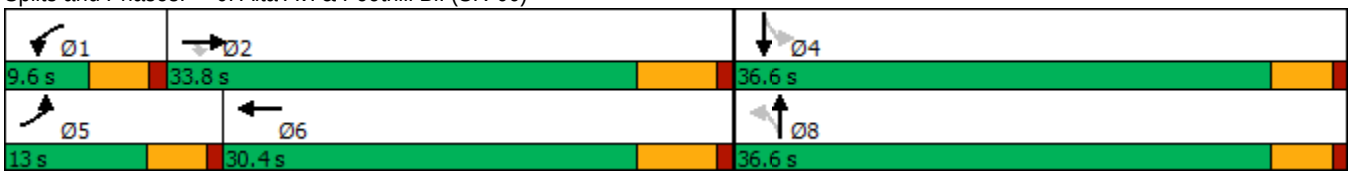
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	12.4	10.1
HCM LOS			B	B

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

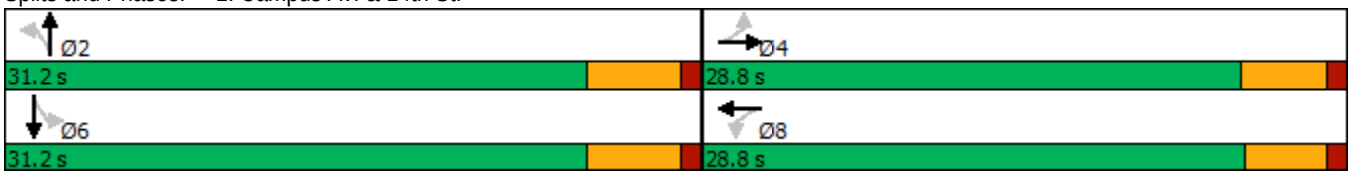
Notes

* 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**

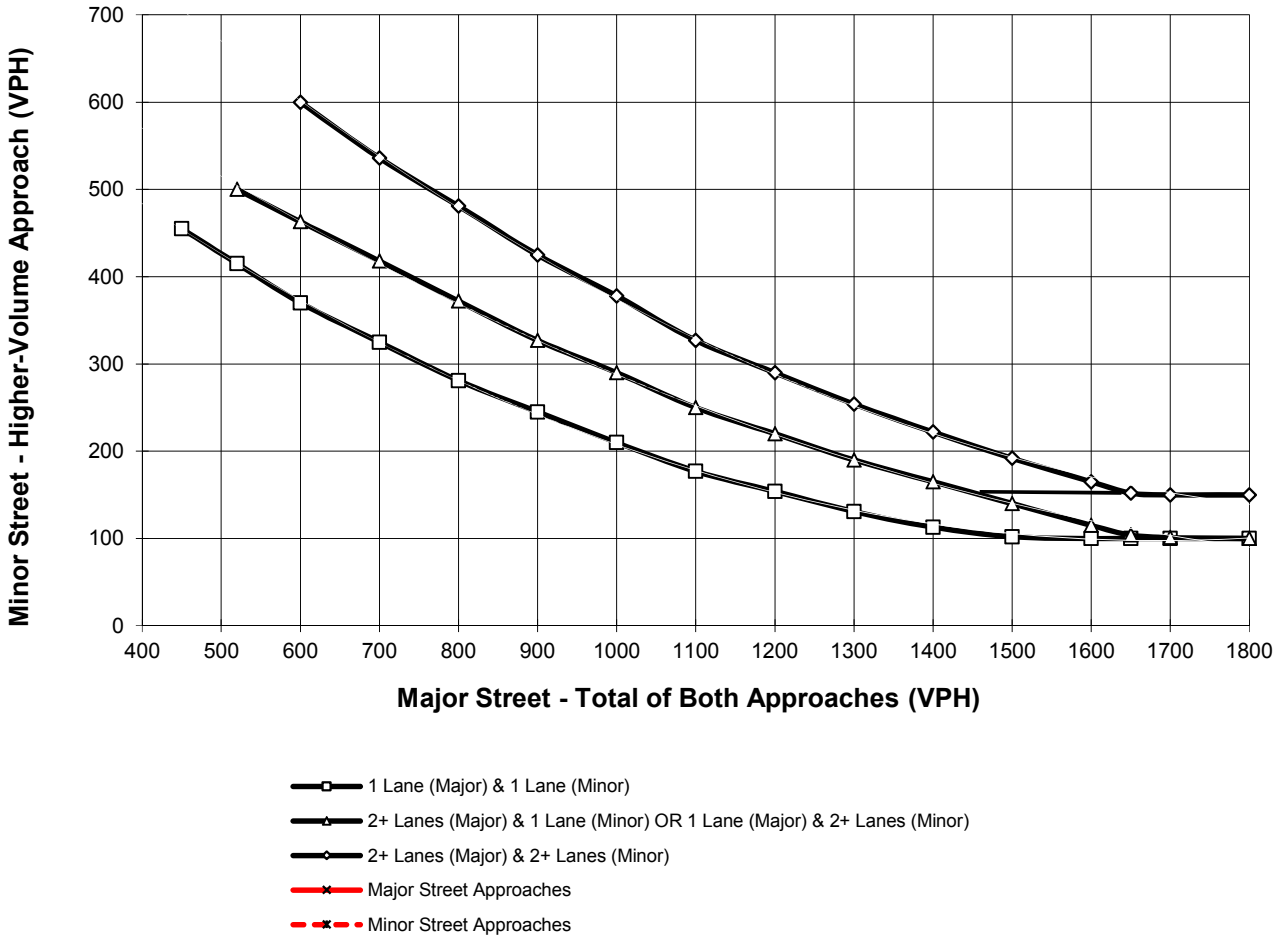
Major Street Name = **15th Street**

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**

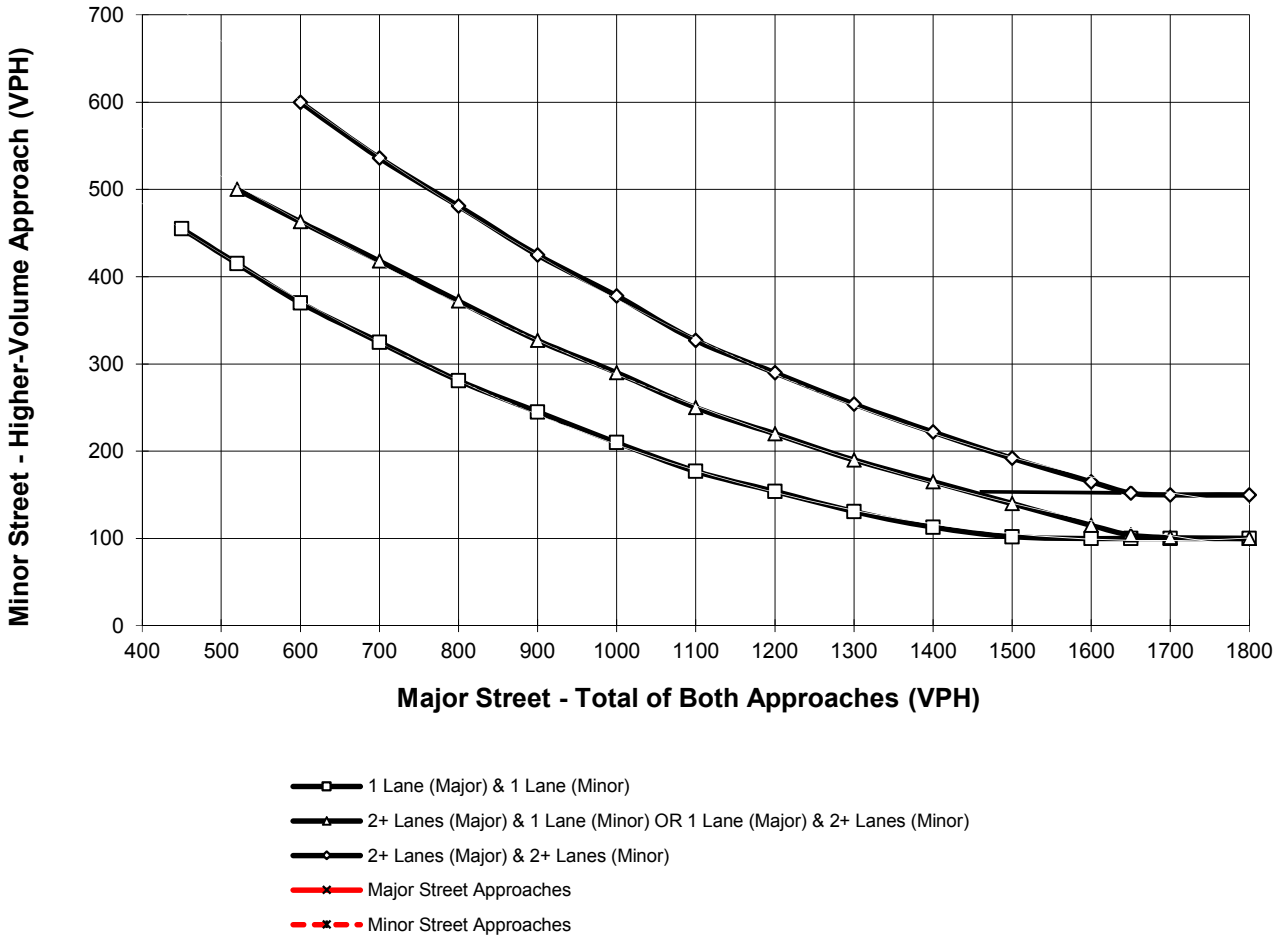
Major Street Name = **14th Street**

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	Job #:	11822
Scenario:	Horizon Year (2040)	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	Job #:	11822
Scenario:	Horizon Year (2040)	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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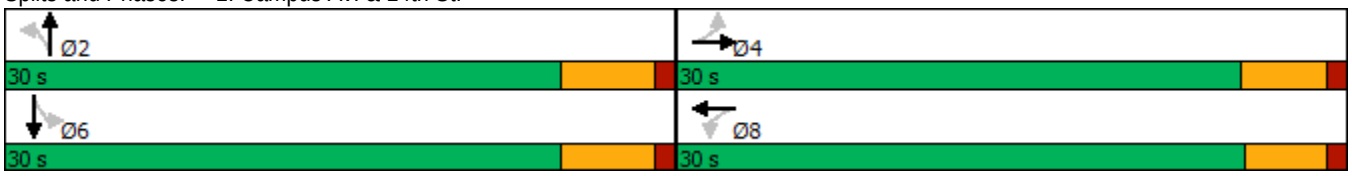
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	73	67	45	135	32	413	116	588
Future Volume (vph)	73	67	45	135	32	413	116	588
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch 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	-

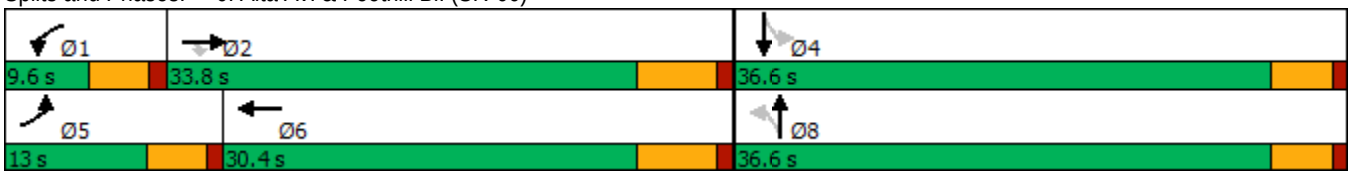
Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.5	13.6	10.4
HCM LOS			B	B

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

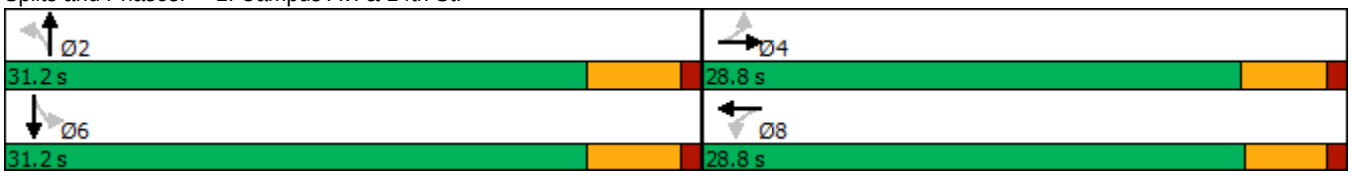
Notes

* 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**

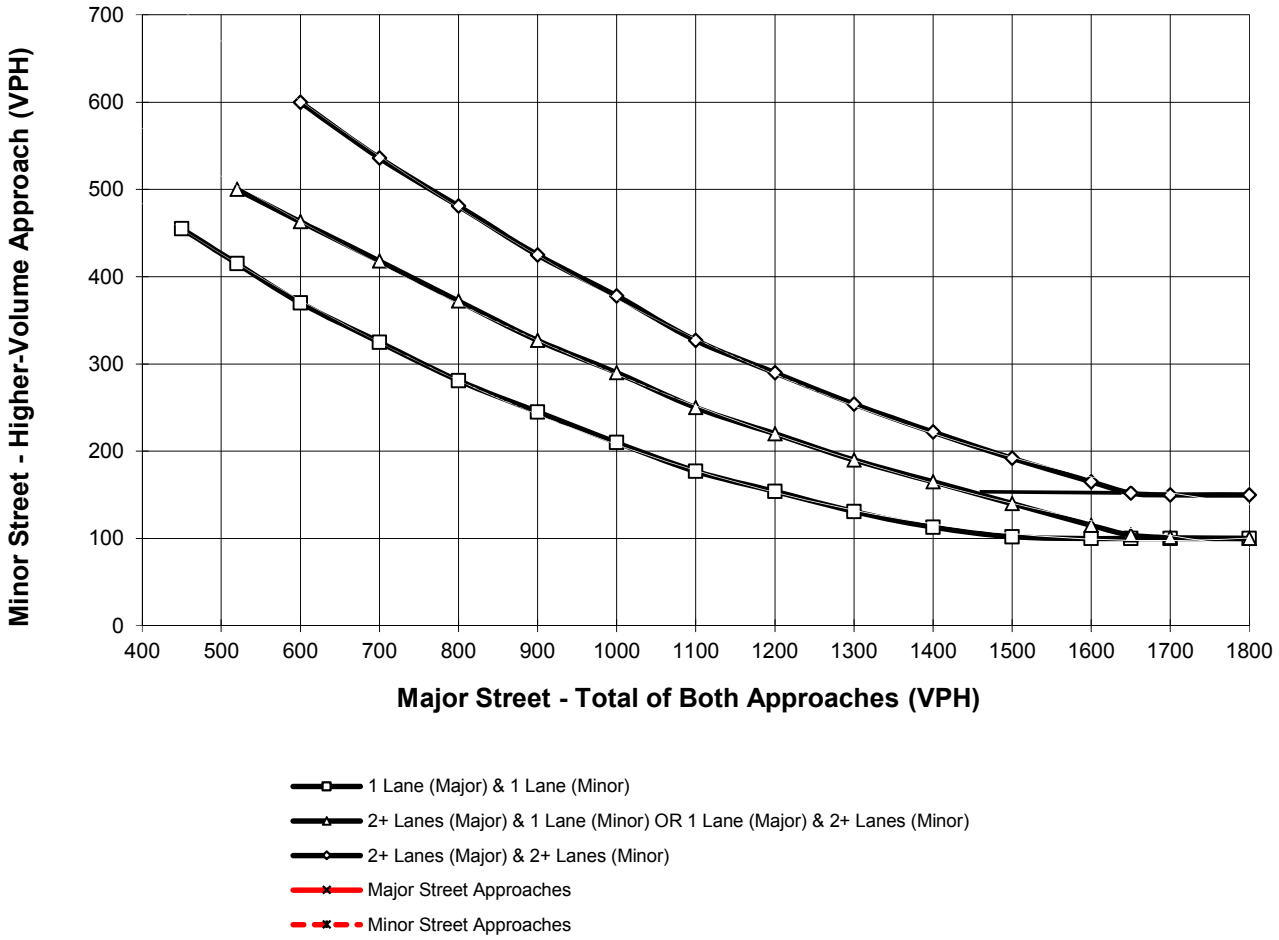
Major Street Name = **15th Street**

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**

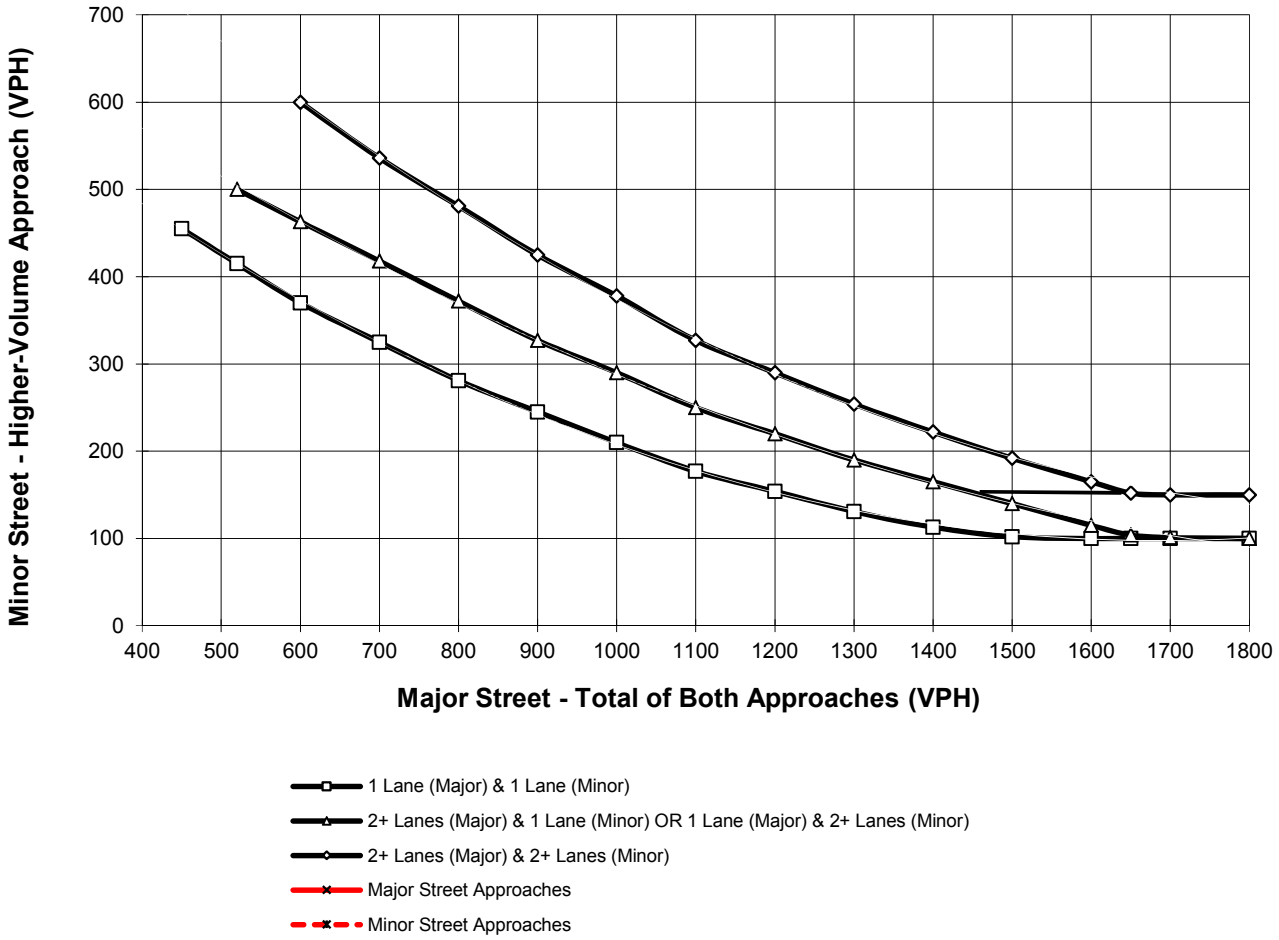
Major Street Name = **15th Street**

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**

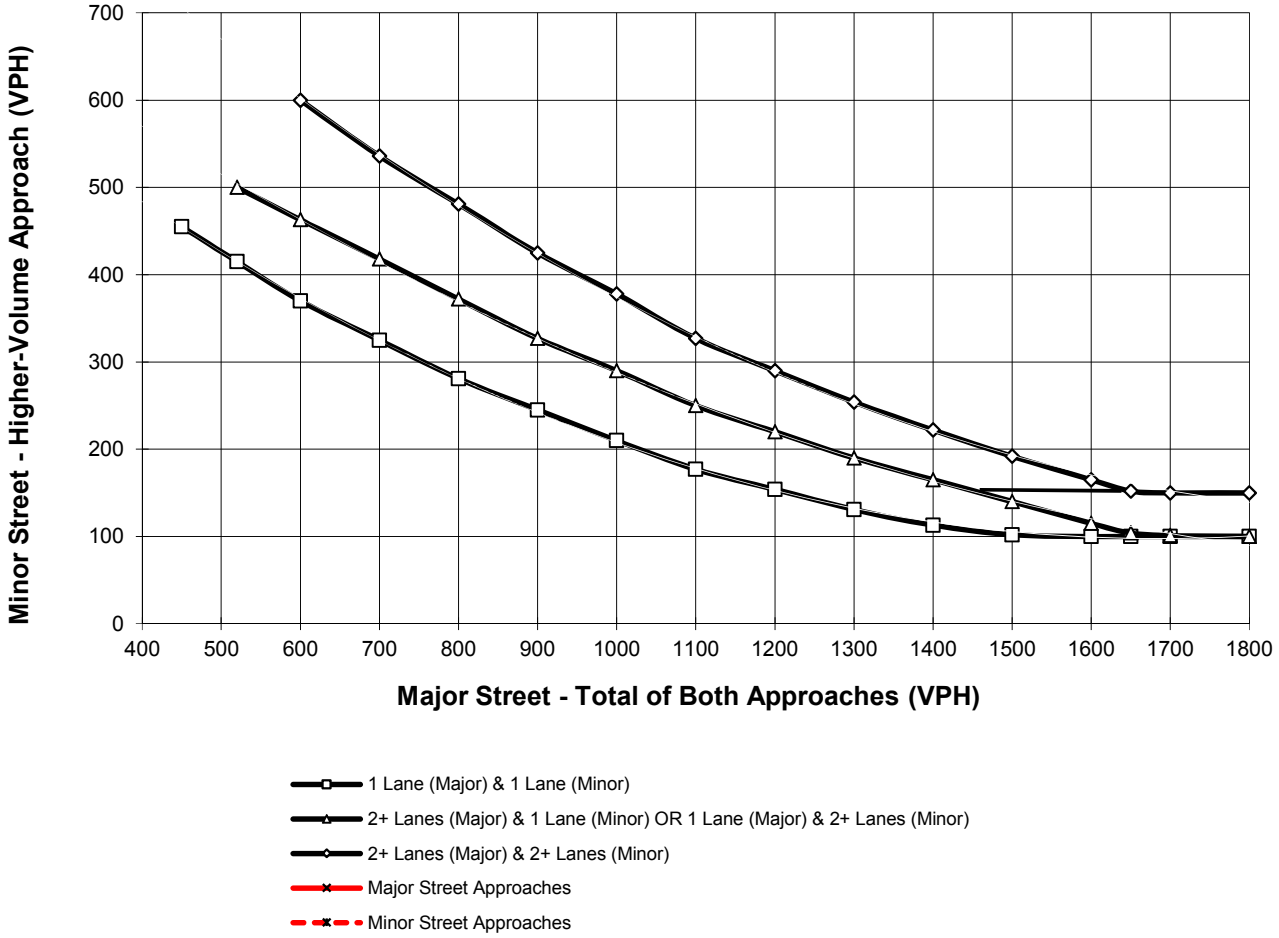
Major Street Name = **15th Street**

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**

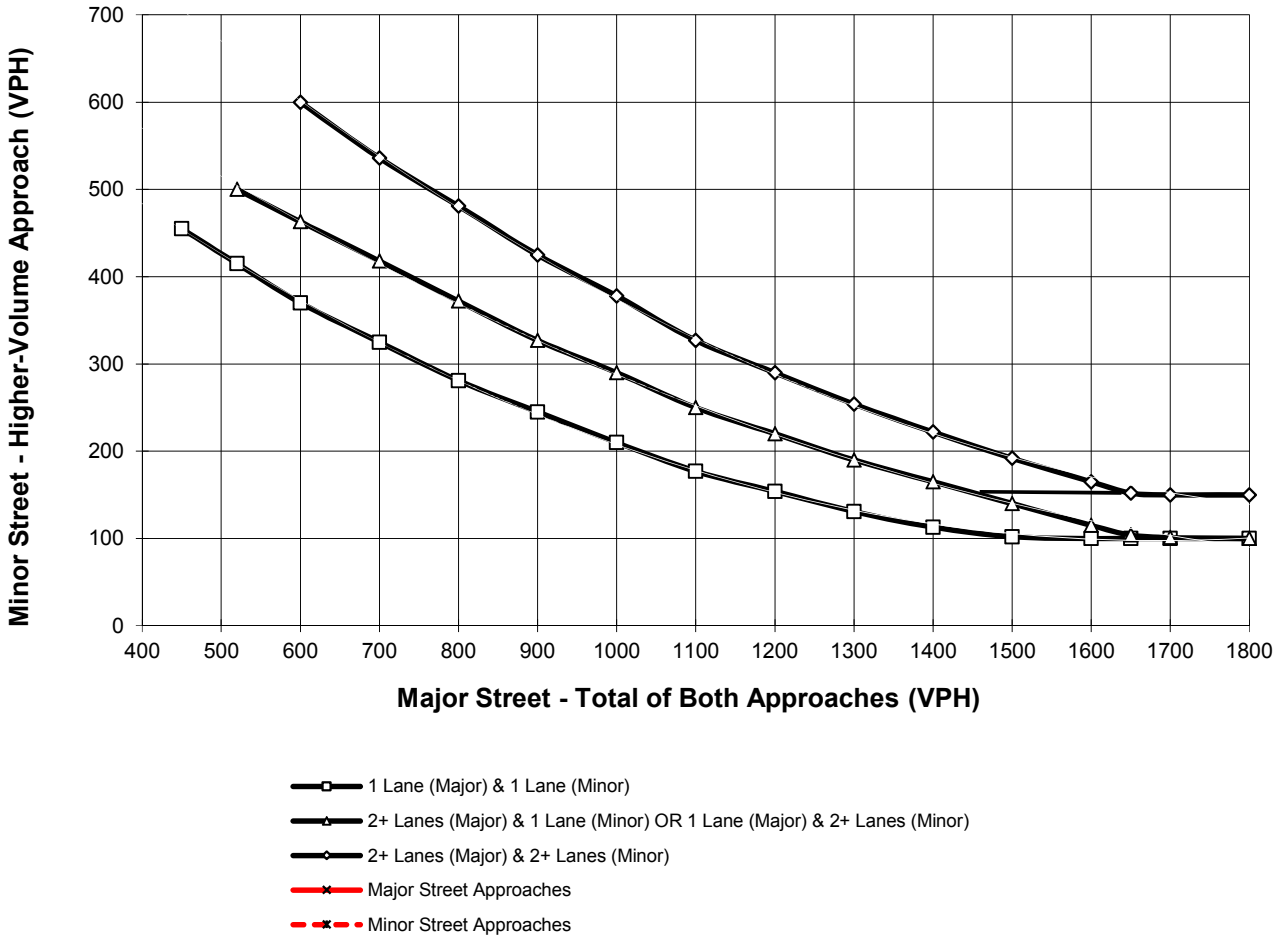
Major Street Name = **14th Street**

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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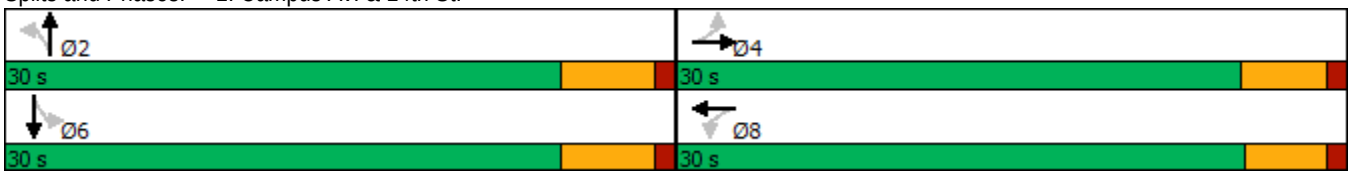
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	76	68	40	134	33	431	115	616
Future Volume (vph)	76	68	40	134	33	431	115	616
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch 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	-

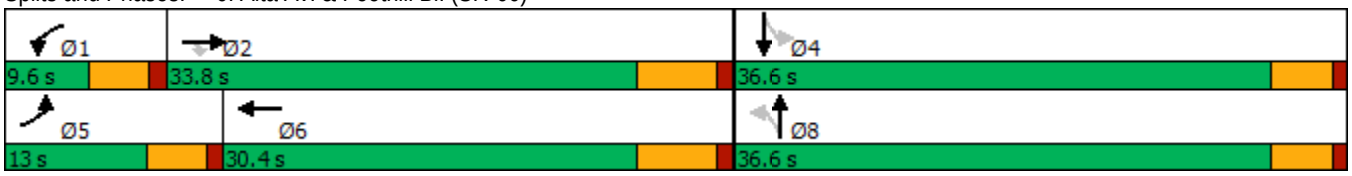
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	12.6	10.1
HCM LOS			B	B

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

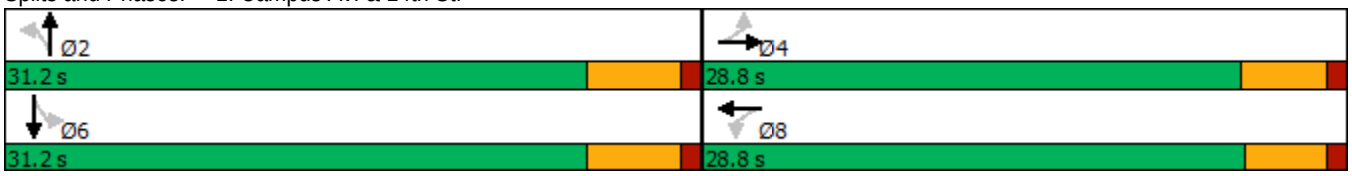
Notes

* 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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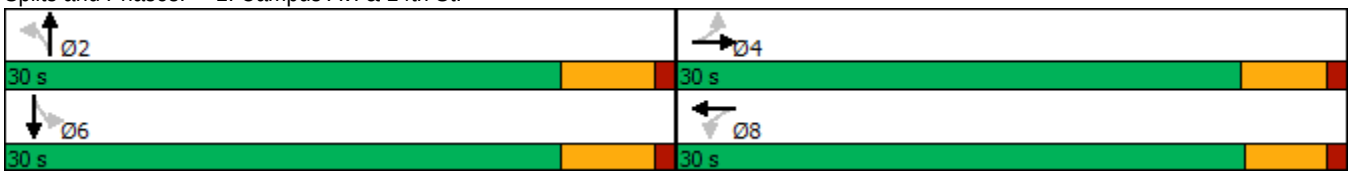
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	76	70	47	140	33	431	120	616
Future Volume (vph)	76	70	47	140	33	431	120	616
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch 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	-

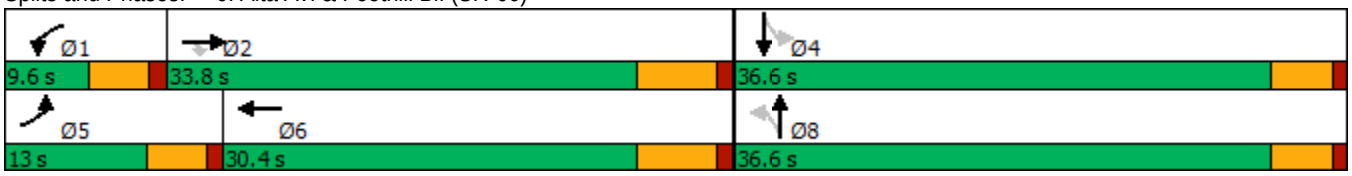
Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.5	13.9	10.5
HCM LOS			B	B

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

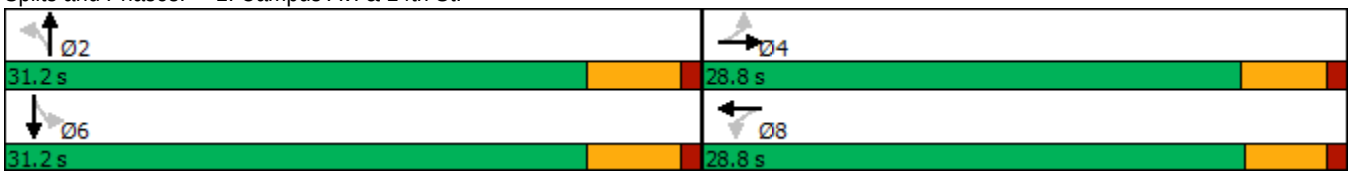
Notes

* 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**

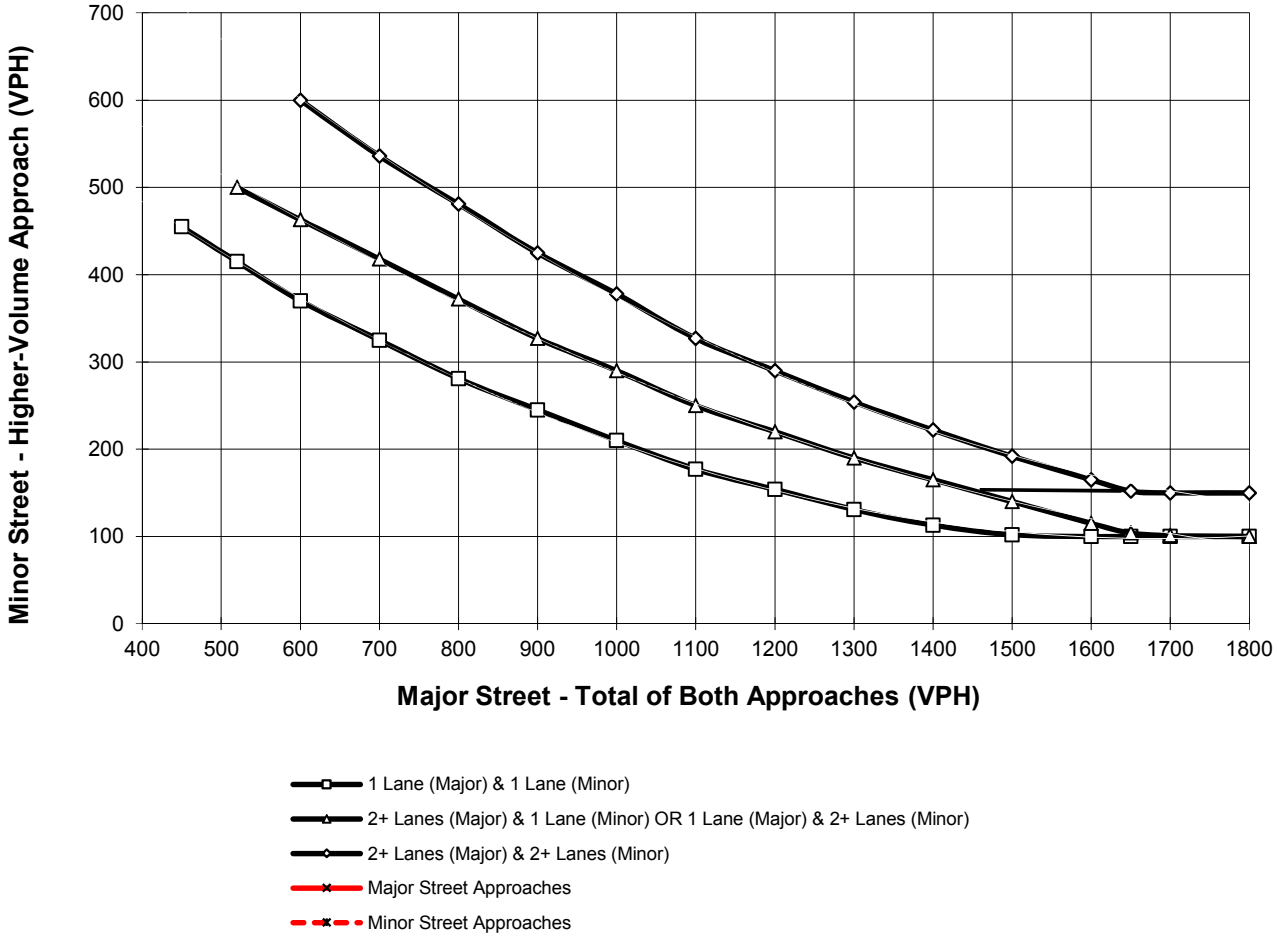
Major Street Name = **15th Street**

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**

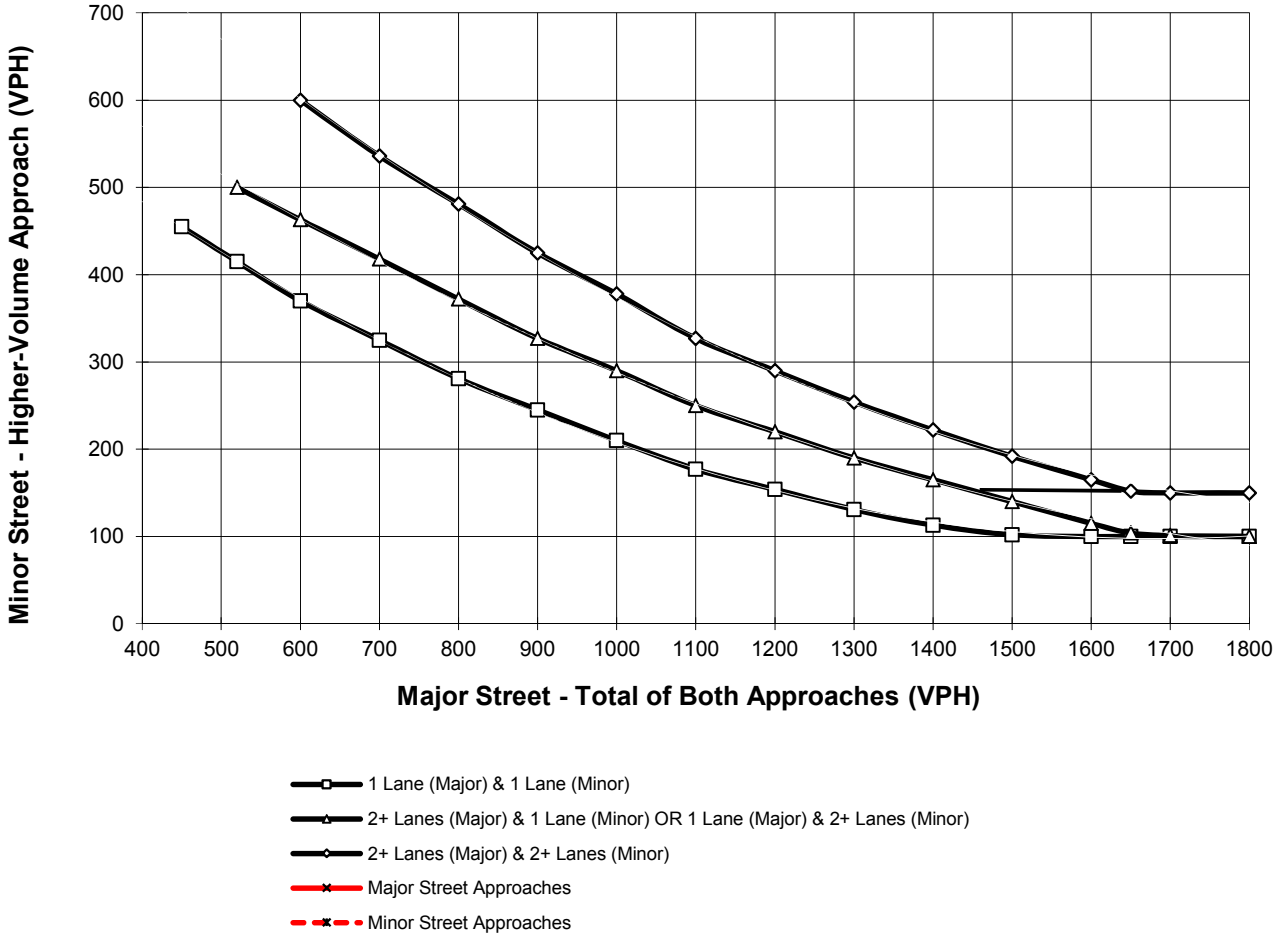
Major Street Name = **14th Street**

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**

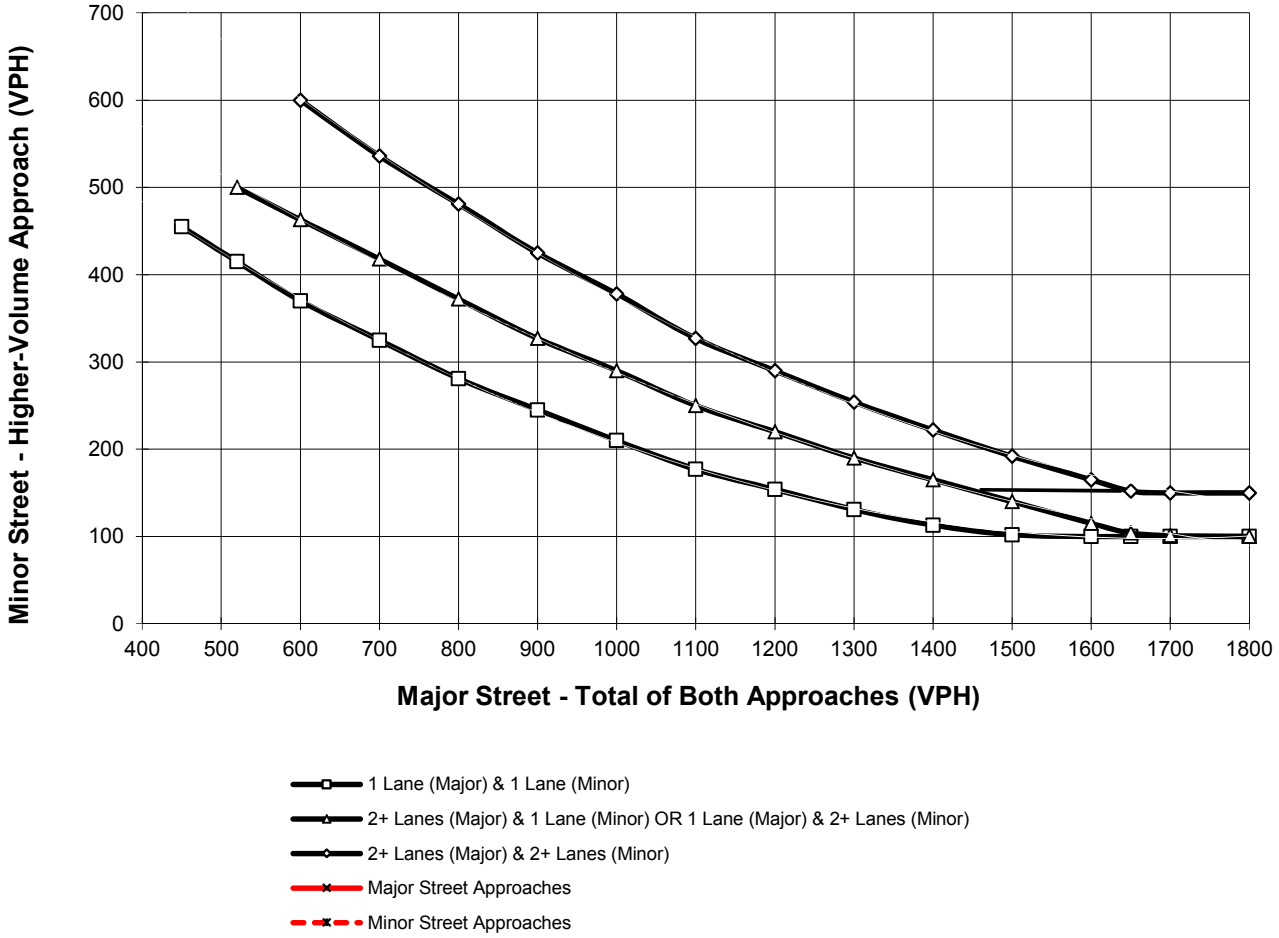
Major Street Name = **15th Street**

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**

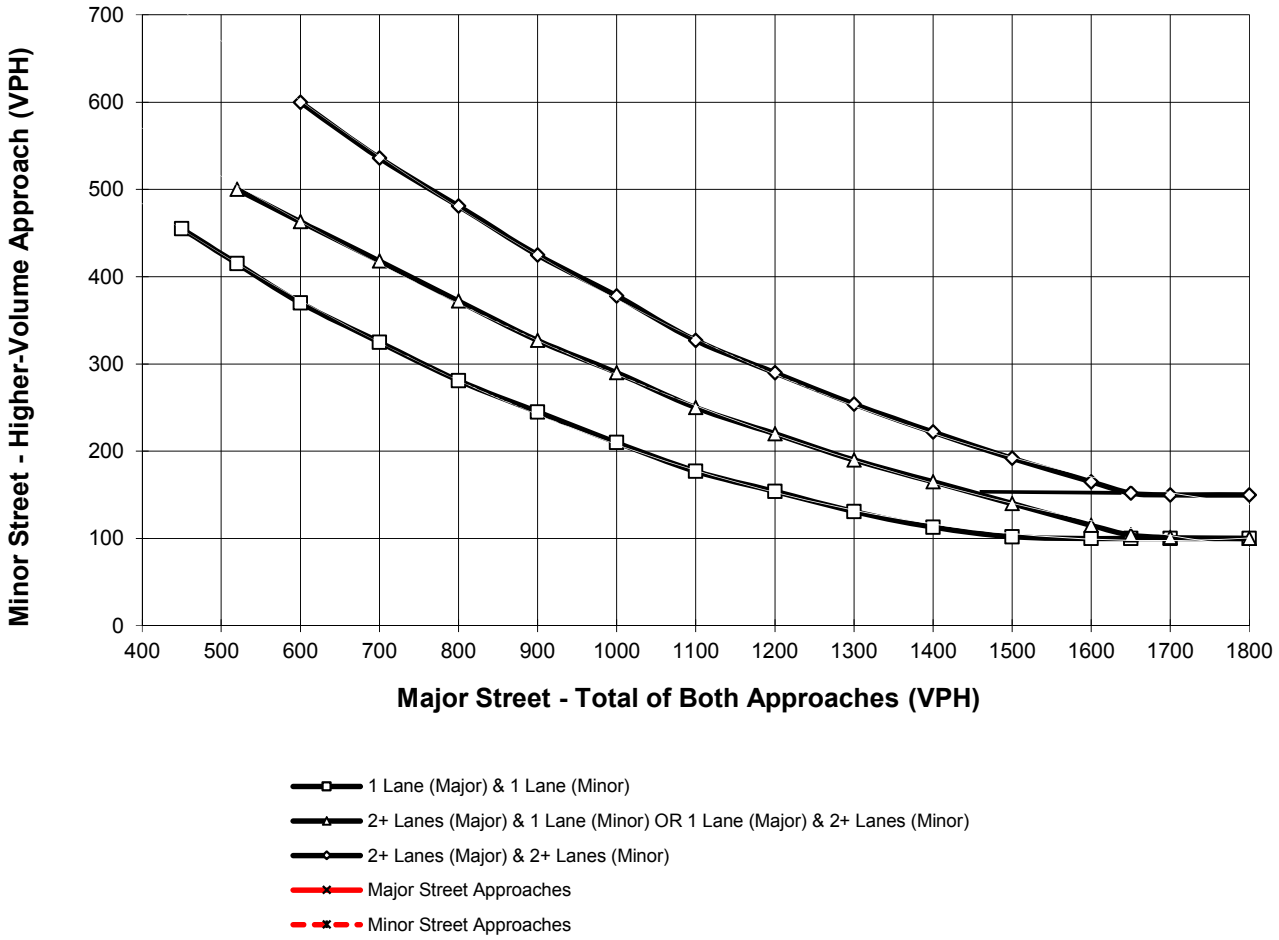
Major Street Name = **15th Street**

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**

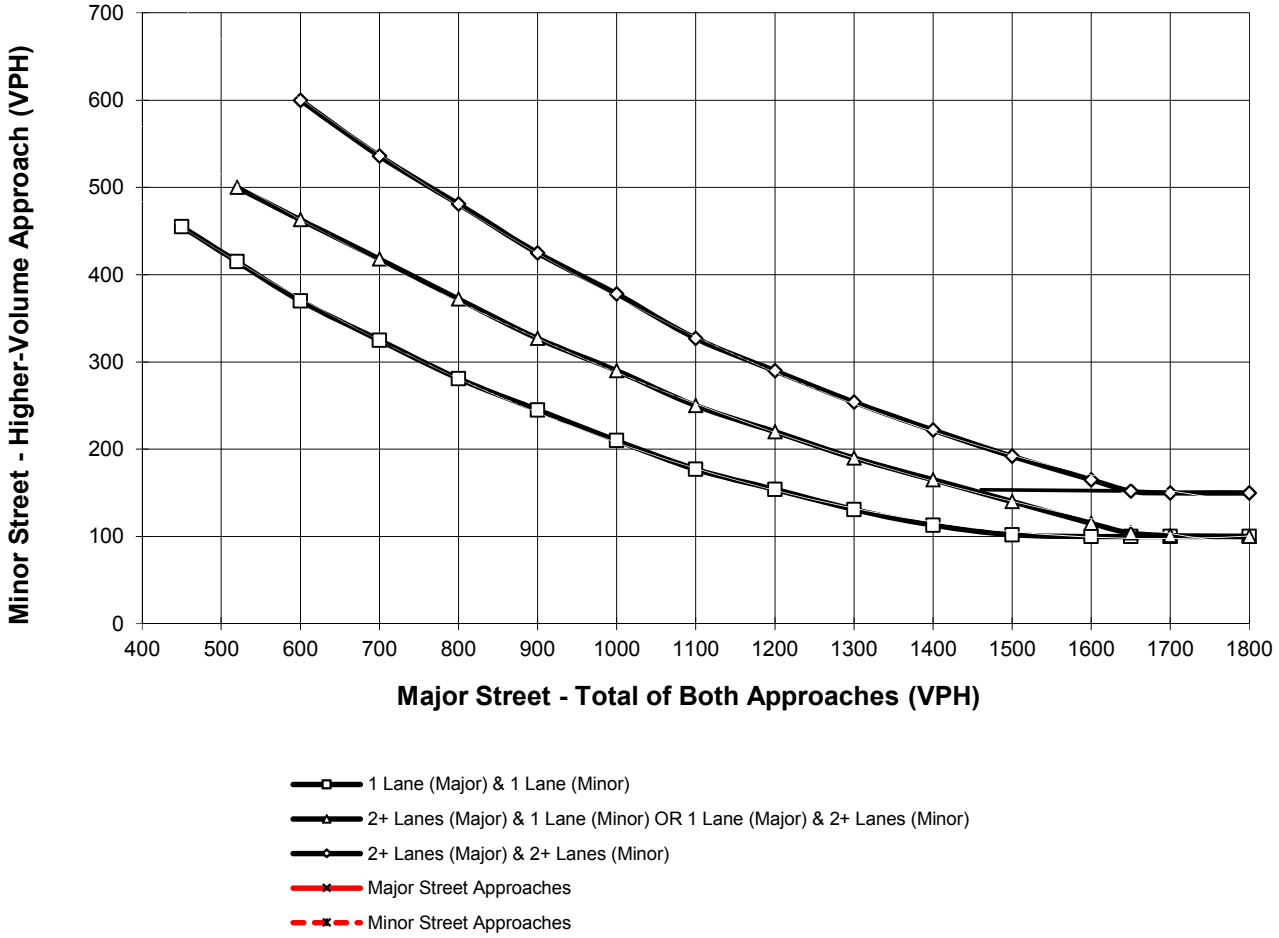
Major Street Name = **15th Street**

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**

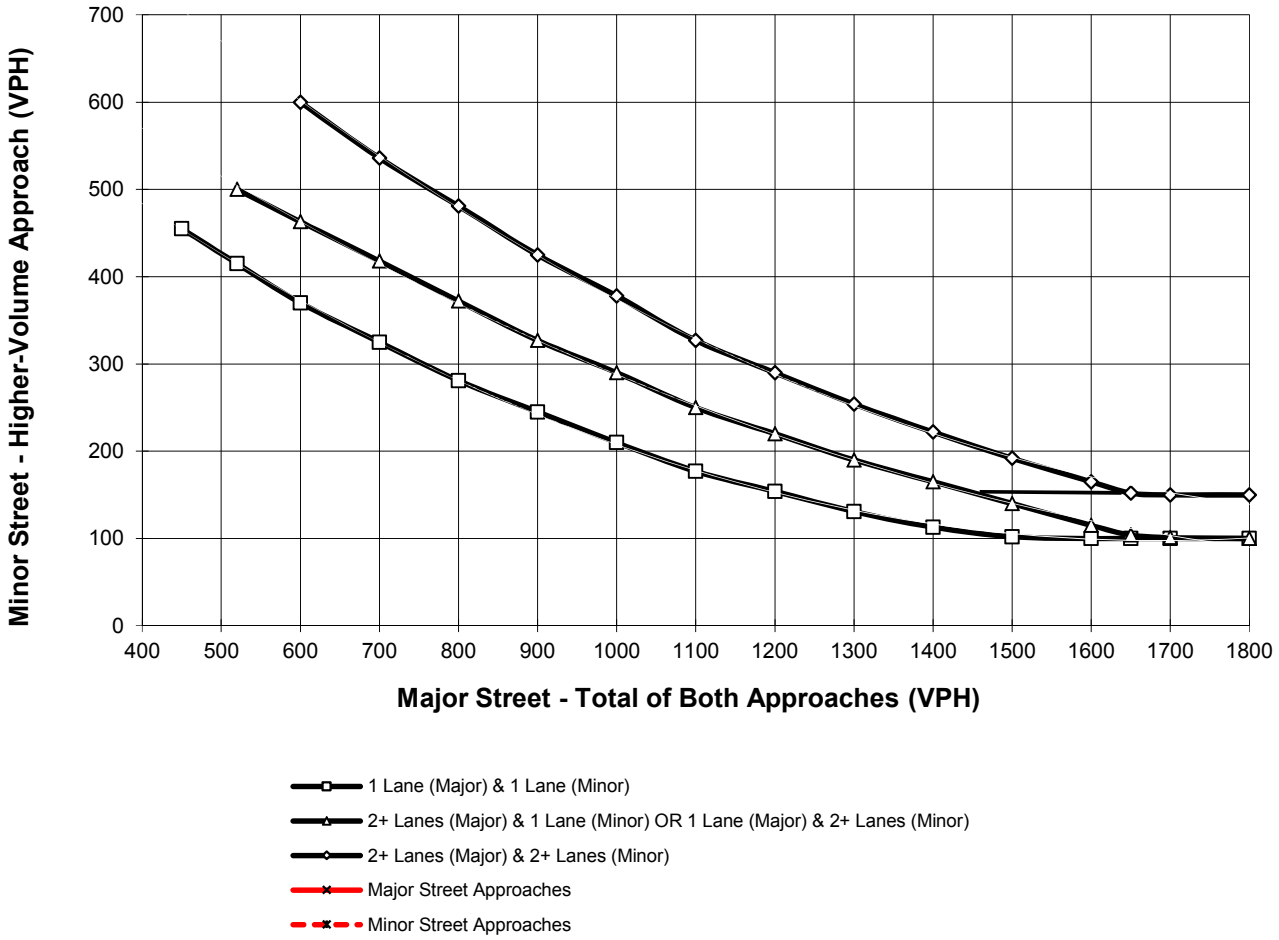
Major Street Name = **14th Street**

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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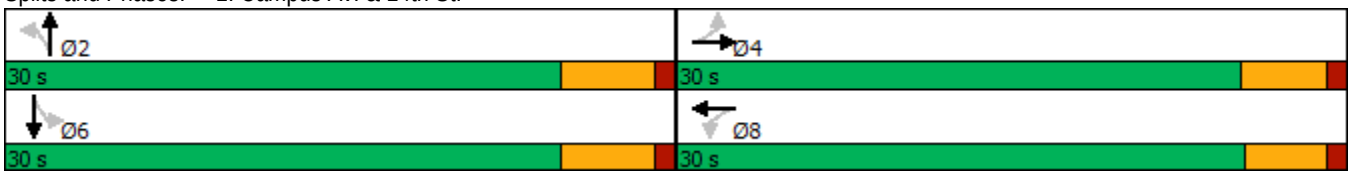
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	119	106	44	182	69	481	127	718
Future Volume (vph)	119	106	44	182	69	481	127	718
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	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	-

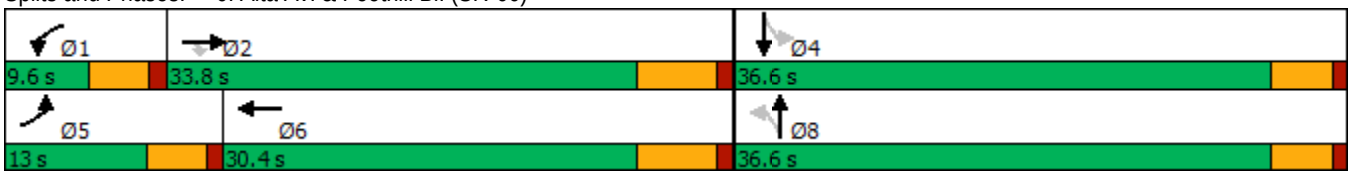
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	15	10.9
HCM LOS			C	B

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

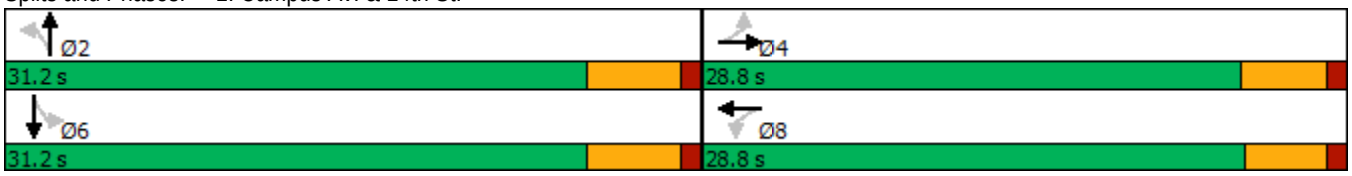
Notes

* 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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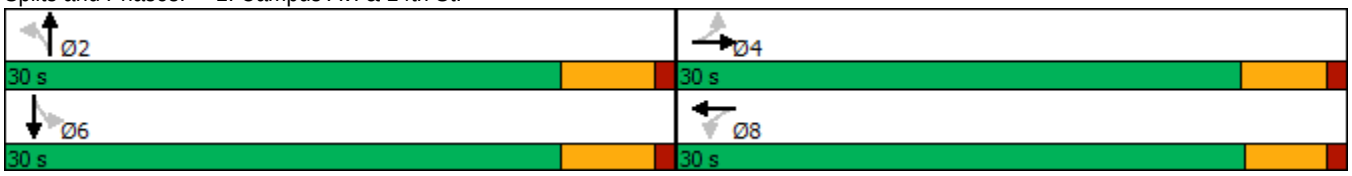
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	119	108	51	188	69	481	132	718
Future Volume (vph)	119	108	51	188	69	481	132	718
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	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	-

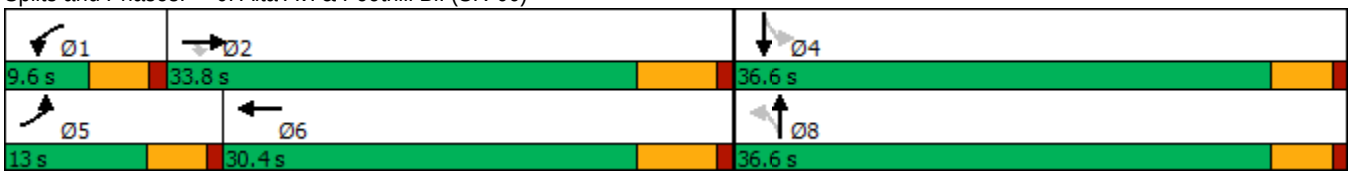
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.5	16.9	11.3
HCM LOS			C	B

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

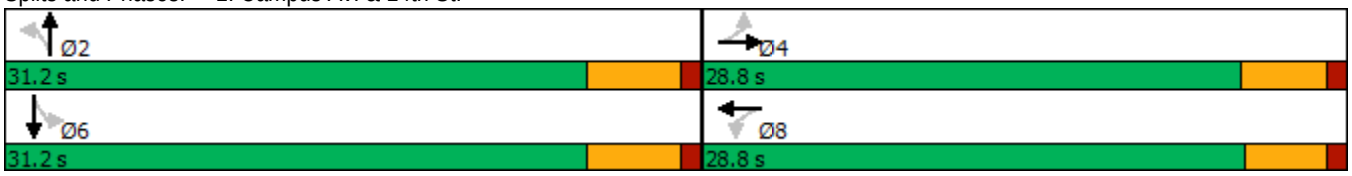
Notes

* 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**

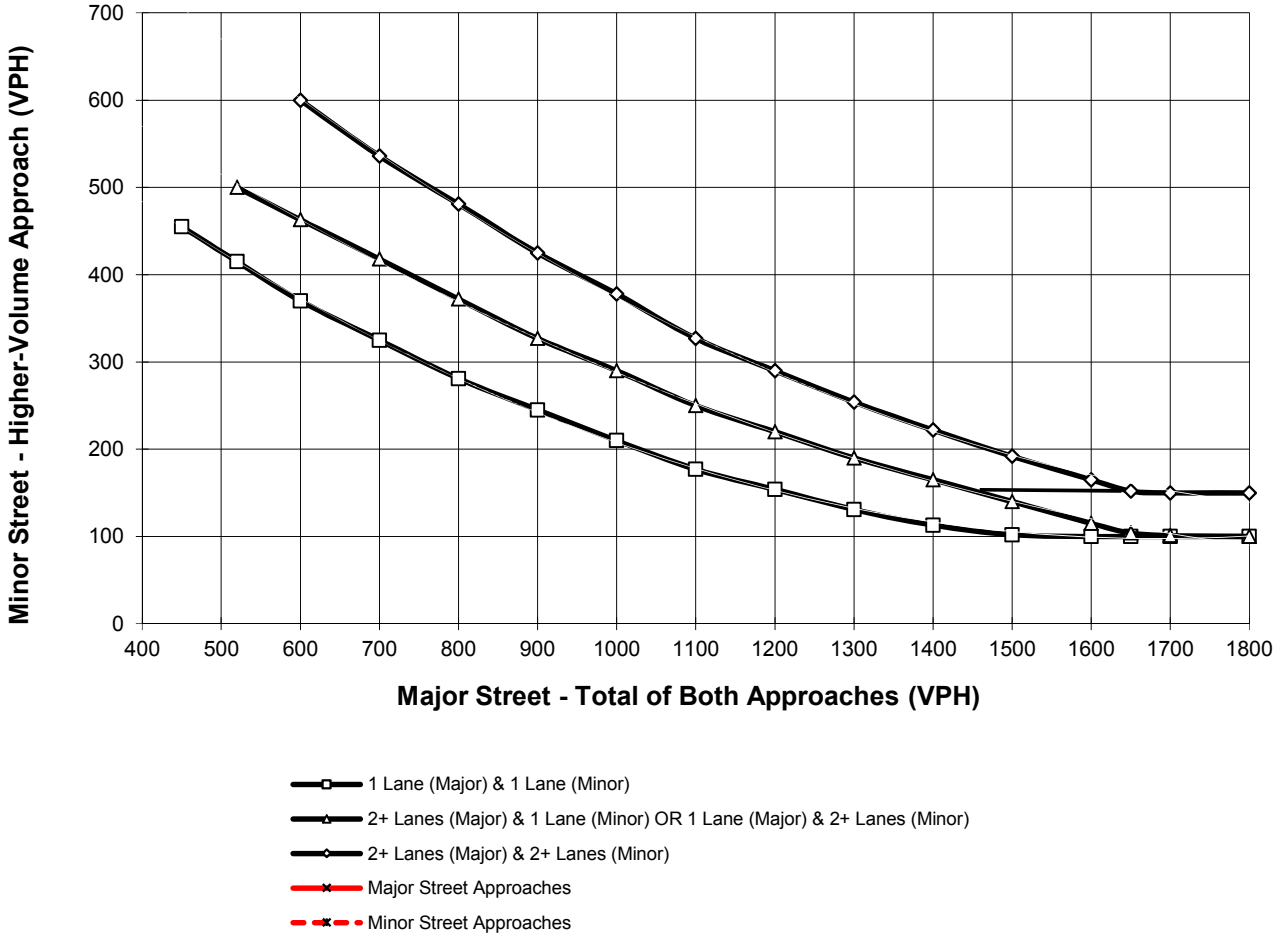
Major Street Name = **15th Street**

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**

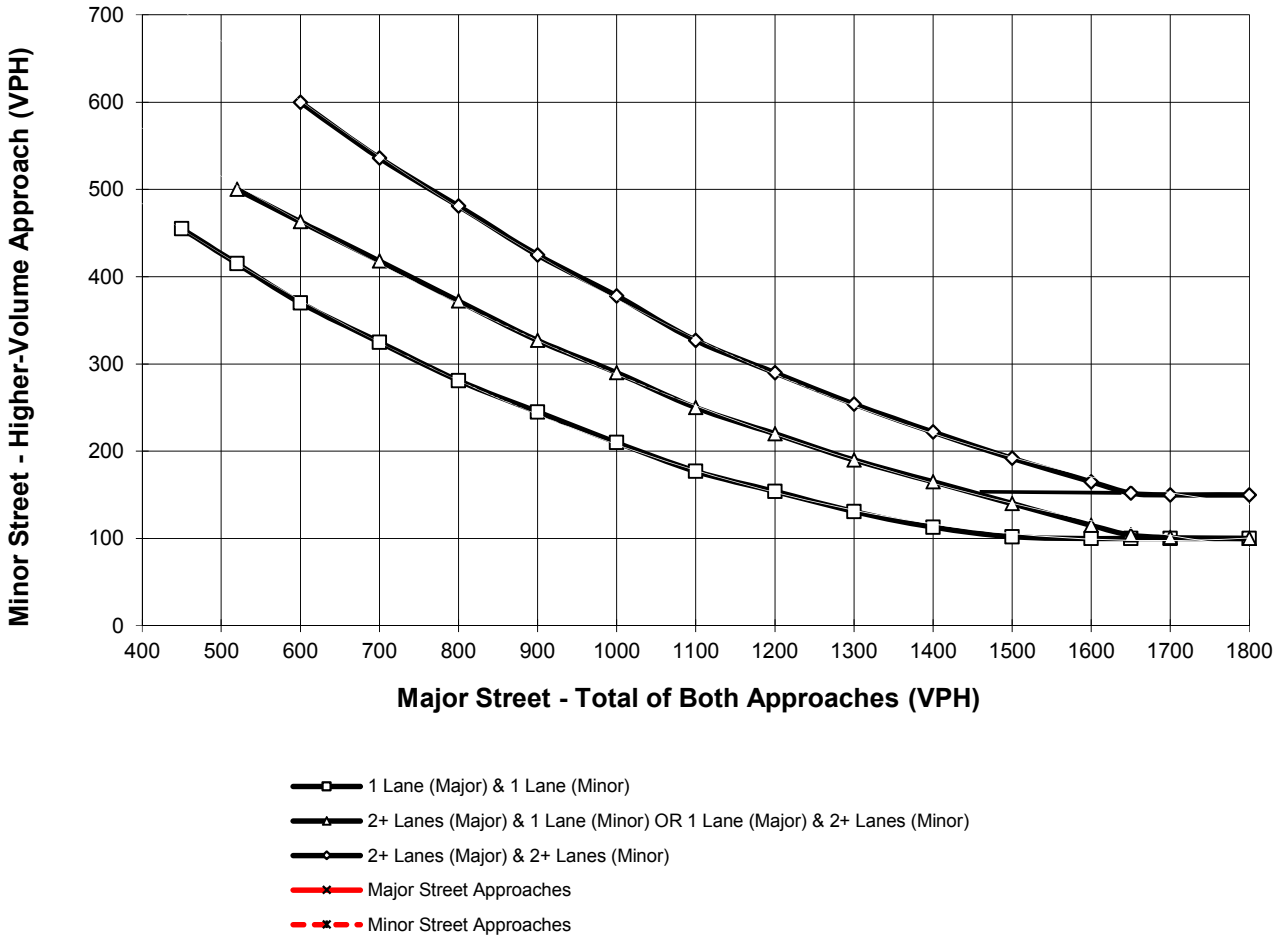
Major Street Name = **14th Street**

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**

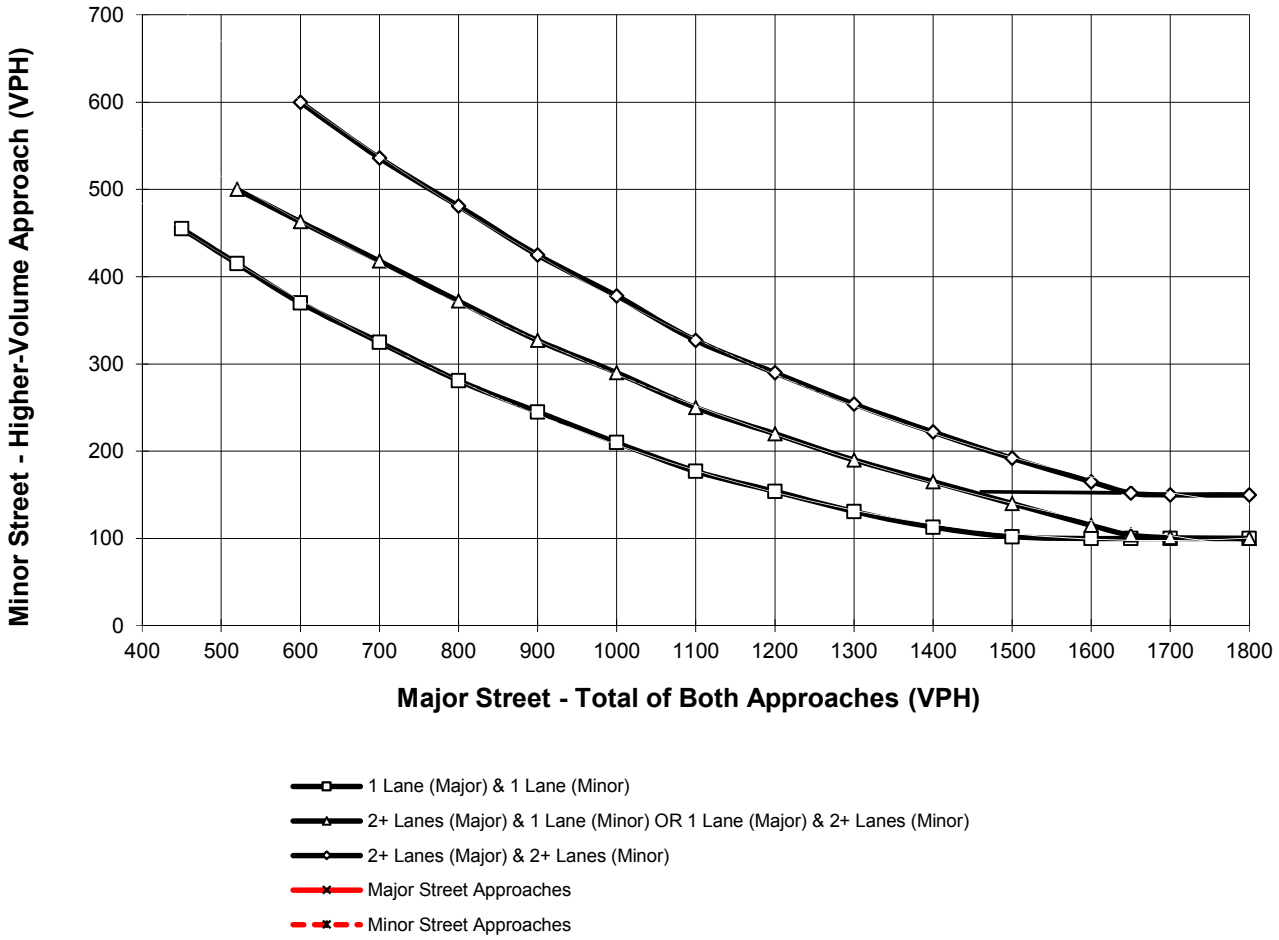
Major Street Name = **15th Street**

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**

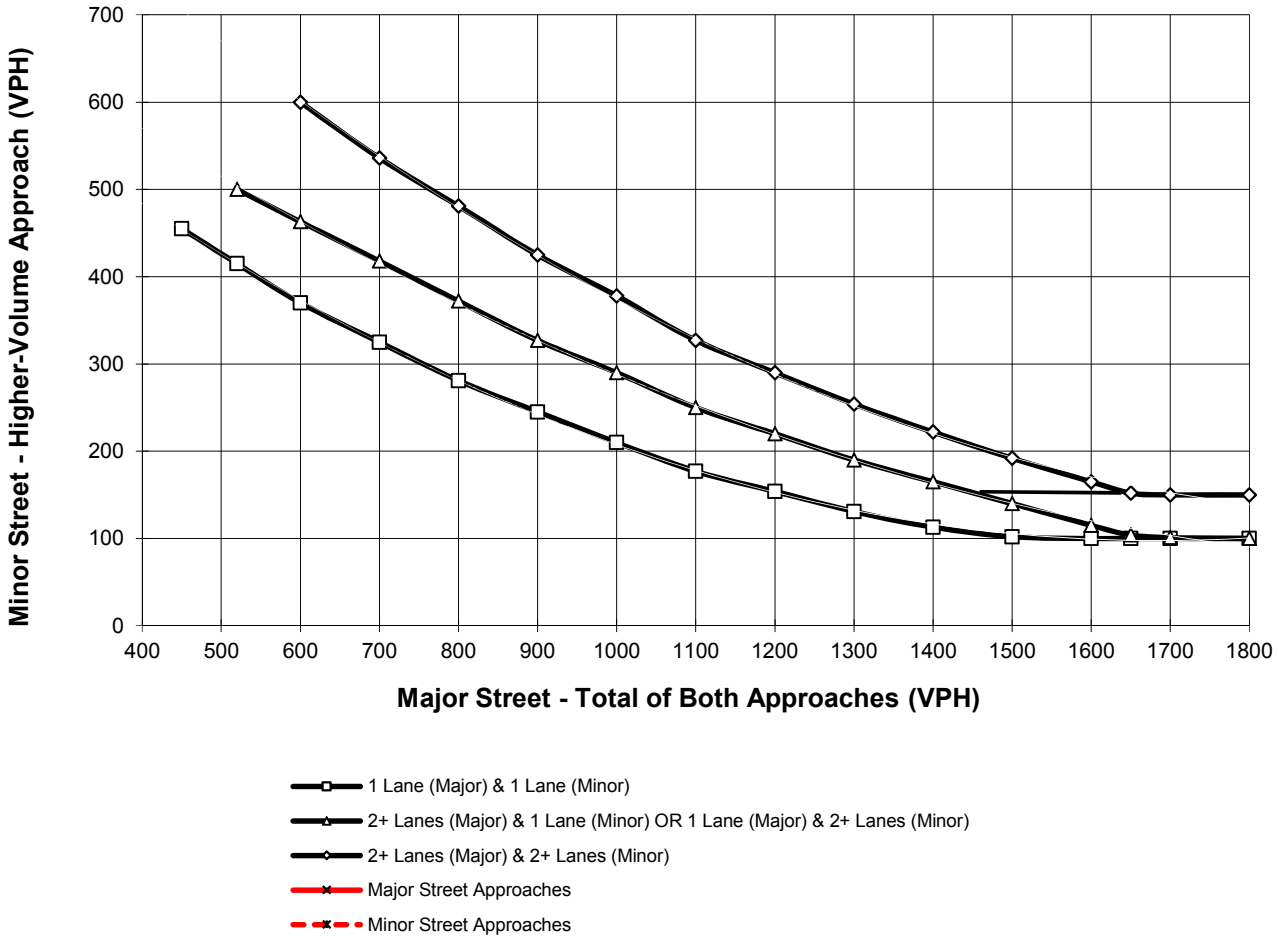
Major Street Name = **15th Street**

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**

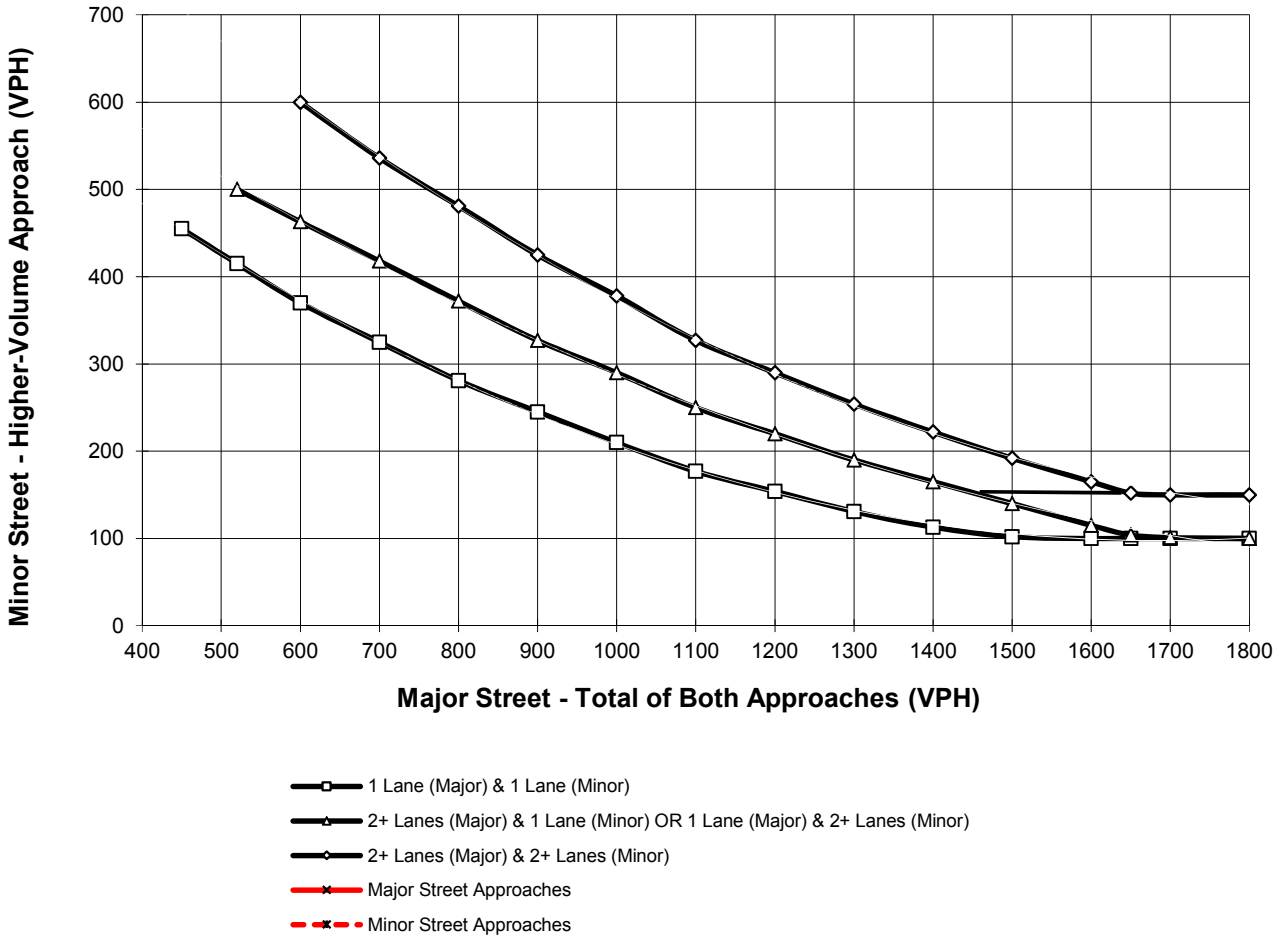
Major Street Name = **15th Street**

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**

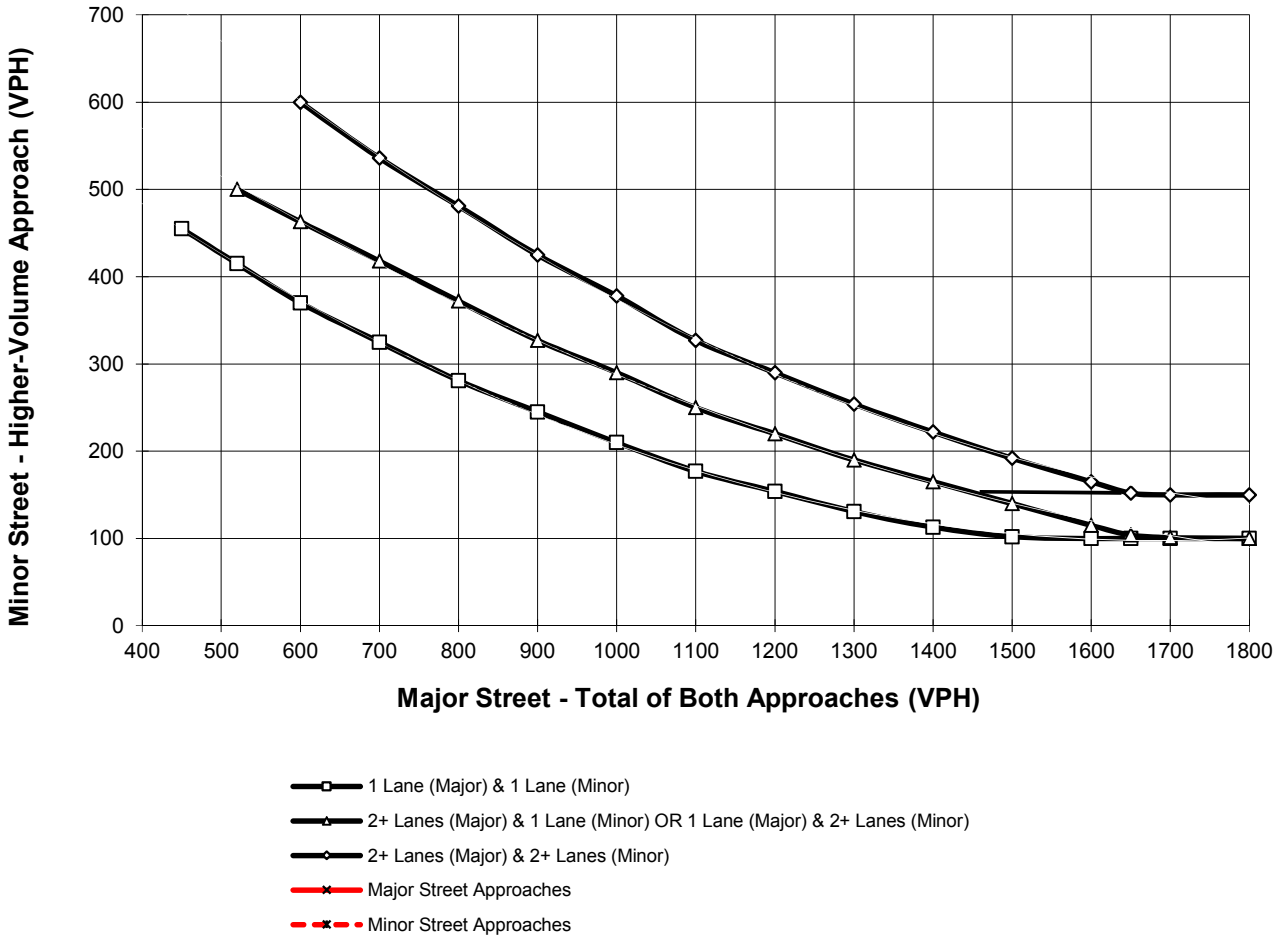
Major Street Name = **14th Street**

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	PROJECT #:	SC
	NORTH & SOUTH:	13th	LOCATION #:	2
	EAST & WEST:	15th	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					RTOR			
	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	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AM	7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AM	8:00 AM	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0	1	1	0	0	0	0
AM	8:15 AM	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0
AM	8:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0
AM	8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AM	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
AM	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
AM	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
AM	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
AM	VOLUMES	1	0	3	0	0	0	0	0	0	4	2	0	10	1	0	0	1	2	0	0	0	0
AM	APPROACH %	25%	0%	75%	0%	0%	0%	0%	0%	0%	67%	33%	0%										
AM	APP/DEPART	4	/	0	0	/	4	0	/	4	6	/	2	0									
AM	BEGIN PEAK HR		7:30 AM																				
AM	VOLUMES	1	0	1	0	0	0	0	0	0	3	2	0	7						0	0	0	0
AM	APPROACH %	50%	0%	50%	0%	0%	0%	0%	0%	0%	60%	40%	0%										
AM	PEAK HR FACTOR		0.500			0.000			0.000			0.417		0.583									
AM	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	0	0	0	0	0	0	0	0	0
PM	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
PM	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
PM	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
PM	4:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	1	0	1	1	0	3	0	0	0	0	0	0	0	0	0
PM	4:45 PM	1	0	0	0	0	0	0	2	0	0	1	0	4	1	0	0	0	1	0	0	0	0
PM	5:00 PM	0	0	1	0	0	0	0	0	0	1	3	0	5	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	1	0	0	0	0	1	1	0	1	0	4	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0
PM	5:45 PM	0	0	0	0	0	0	0	1	0	1	2	0	4	0	0	0	0	0	0	0	0	0
PM	VOLUMES	1	0	2	0	0	0	0	6	1	6	10	0	26	1	0	0	0	1	0	0	0	0
PM	APPROACH %	33%	0%	67%	0%	0%	0%	0%	86%	14%	38%	63%	0%										
PM	APP/DEPART	3	/	0	0	/	8	7	/	8	16	/	10	0									
PM	BEGIN PEAK HR		4:30 PM																				
PM	VOLUMES	0	0	2	0	0	0	0	2	1	4	7	0	16						0	0	0	0
PM	APPROACH %	0%	0%	100%	0%	0%	0%	0%	67%	33%	36%	64%	0%										
PM	PEAK HR FACTOR		0.500			0.000			0.375			0.688		0.800									
PM	APP/DEPART	2	/	0	0	/	5	3	/	4	11	/	7	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
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:30 AM	1	0	2	0	3	1	0	2	0	3	0	0	0	0	0
AM	8:45 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	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
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	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

AimTD LLC

TURNING MOVEMENT COUNTS

Upland SC — ALL HOURS

13th (north leg)

TOTAL	0	0	0	0		0
PM	0	0	0	0		0
AM	0	0	0	0		0

15th (west leg)

TOTAL	12	0	6	1	7
PM	10	0	6	1	7
AM	2	0	0	0	0

15th (east leg)

TOTAL	22	0	12	10	12
PM	16	0	10	6	8
AM	6	0	2	4	4

13th (south leg)

AM	4		1	0	3	4
PM	8		1	0	2	3
TOTAL	12		2	0	5	7

PEAK HOUR

AM 7:30 AM

PM 4:30 PM

13th (north leg)

TOTAL	0	0	0	0		0
PM	0	0	0	0		0
AM	0	0	0	0		0

15th (west leg)

TOTAL	9	0	2	1	3
PM	7	0	2	1	3
AM	2	0	0	0	0

15th (east leg)

TOTAL	16	0	9	7	6
PM	11	0	7	4	4
AM	5	0	2	3	2

13th (south leg)

AM	3		1	0	1	2
PM	5		0	0	2	2
Total	8		1	0	3	4

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

N

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

URBAN CROSSROADS

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:

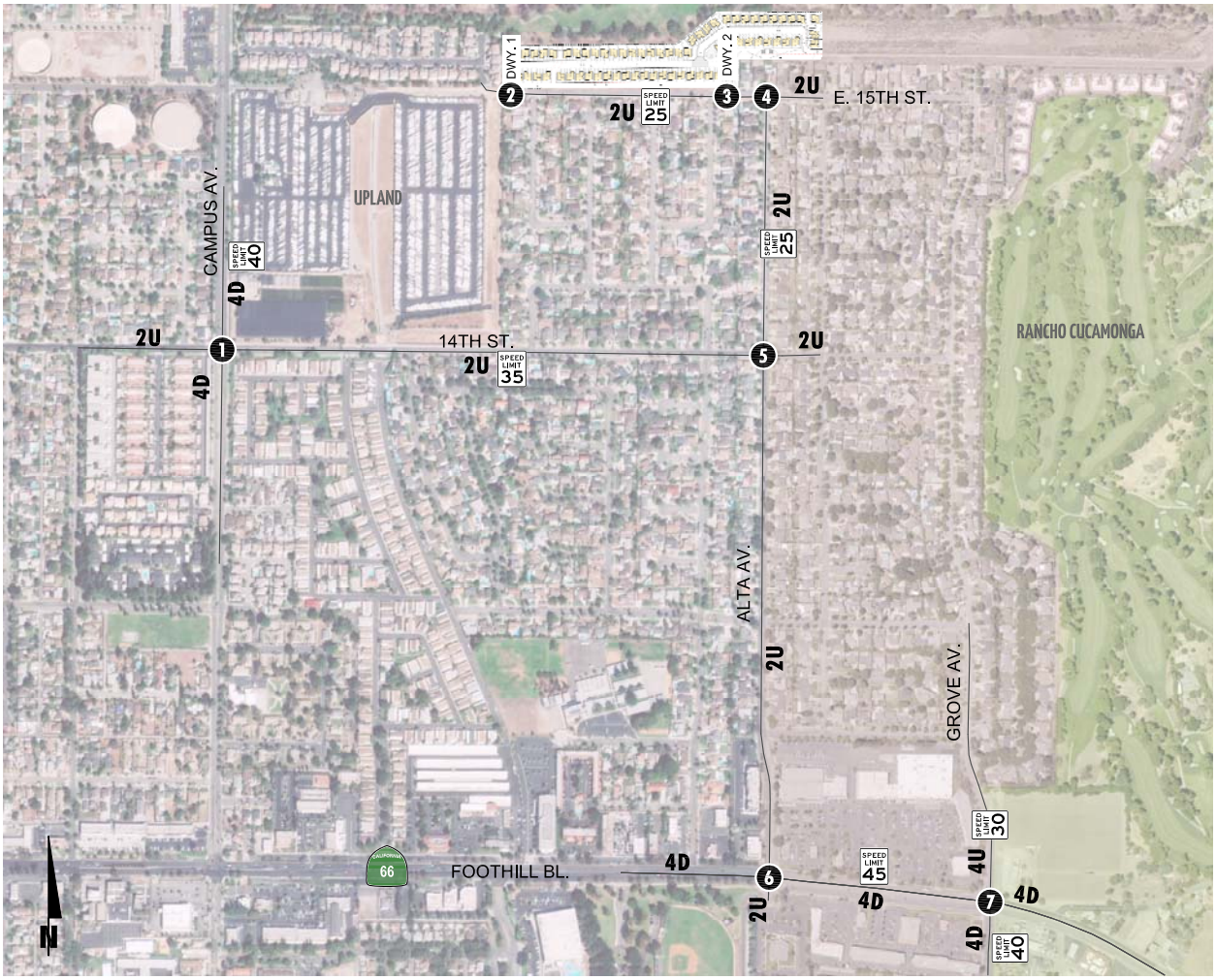
- Campus Avenue

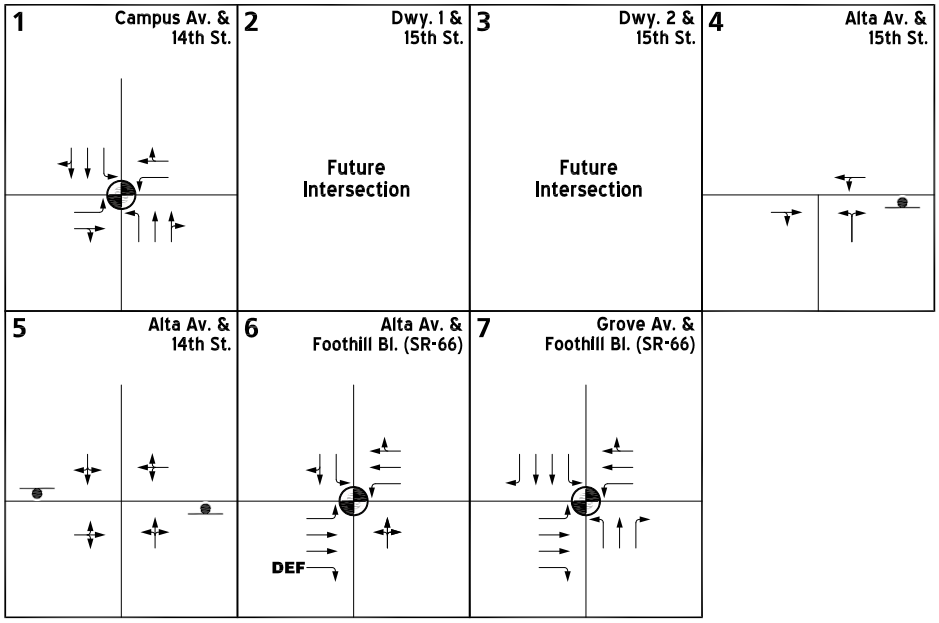
3.2.2 CITY OF RANCHO CUCAMONGA

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





LEGEND:

- = TRAFFIC SIGNAL
- = STOP SIGN
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- DEF = DEFACTO RIGHT TURN
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

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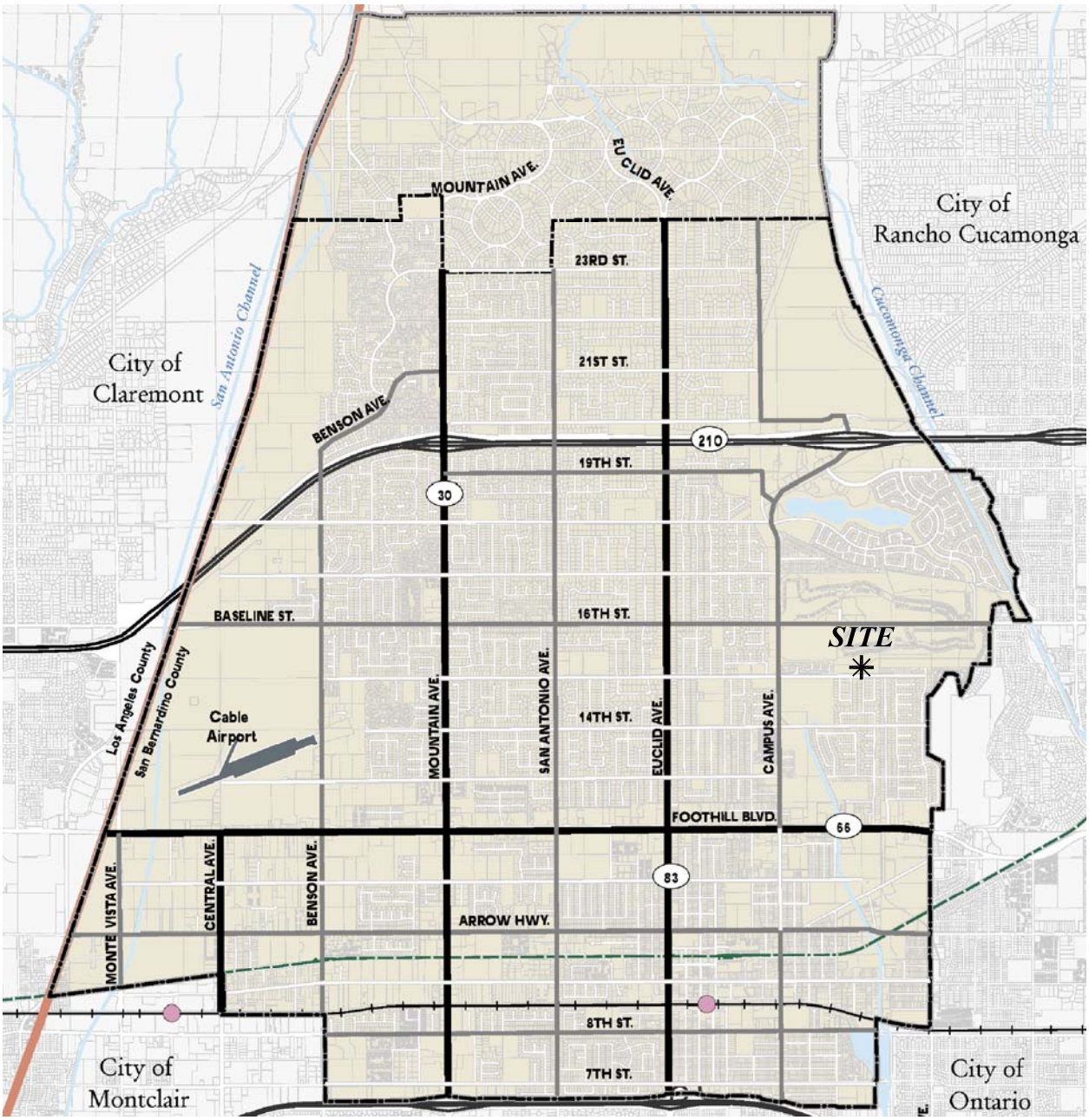
EXHIBIT 3-2: CITY OF UPLAND GENERAL PLAN CIRCULATION ELEMENT



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

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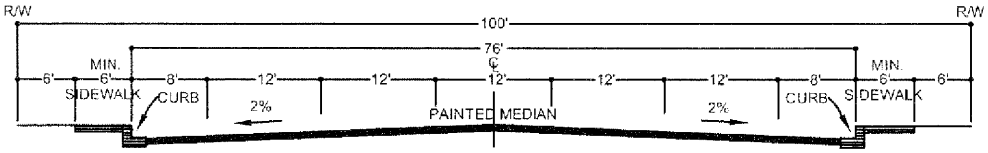
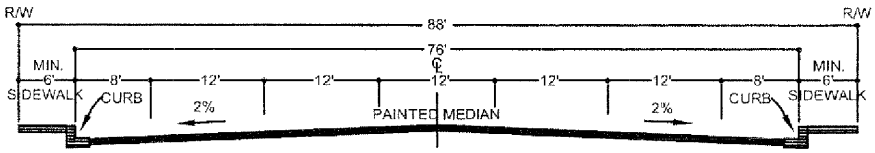
URBAN CROSSROADS

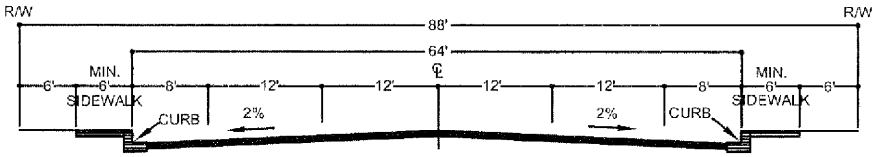
EXHIBIT 3-3: CITY OF UPLAND GENERAL PLAN ROADWAY CROSS-SECTIONS



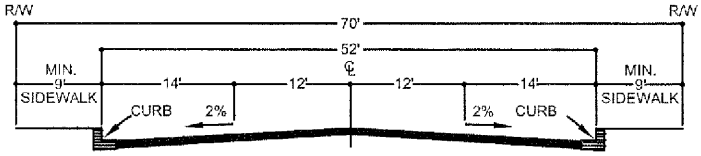
MAJOR (A)



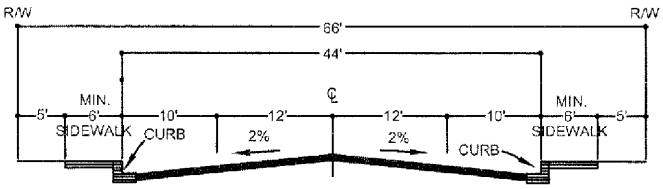
MAJOR (B)



SECONDARY (A)



SECONDARY (B)



COLLECTOR

SOURCE: CITY OF UPLAND

EXHIBIT 3-4: CITY OF RANCHO CUCAMONGA GENERAL PLAN CIRCULATION ELEMENT

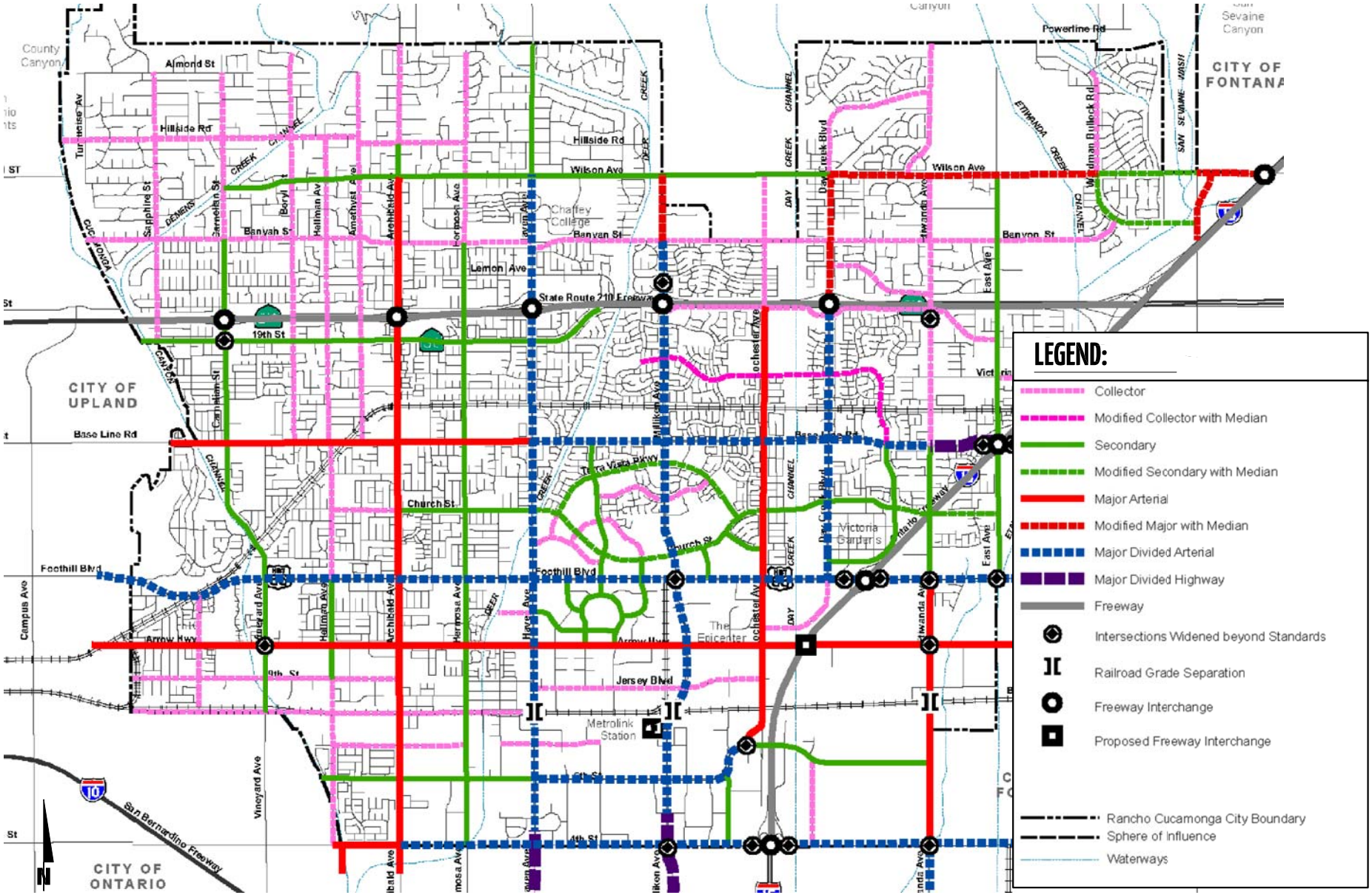
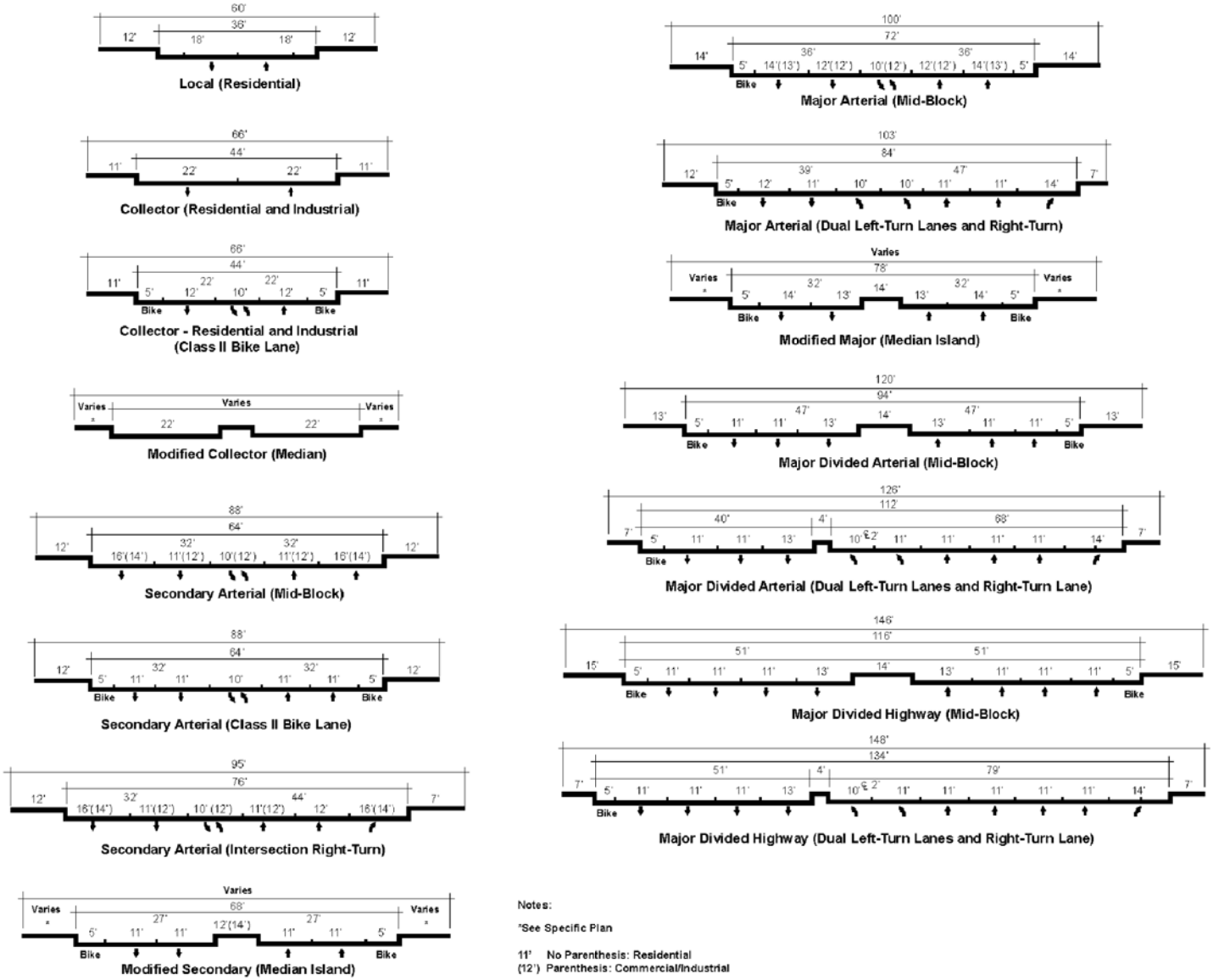


EXHIBIT 3-5: CITY OF RANCHO CUCAMONGA ROADWAY CROSS-SECTIONS



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

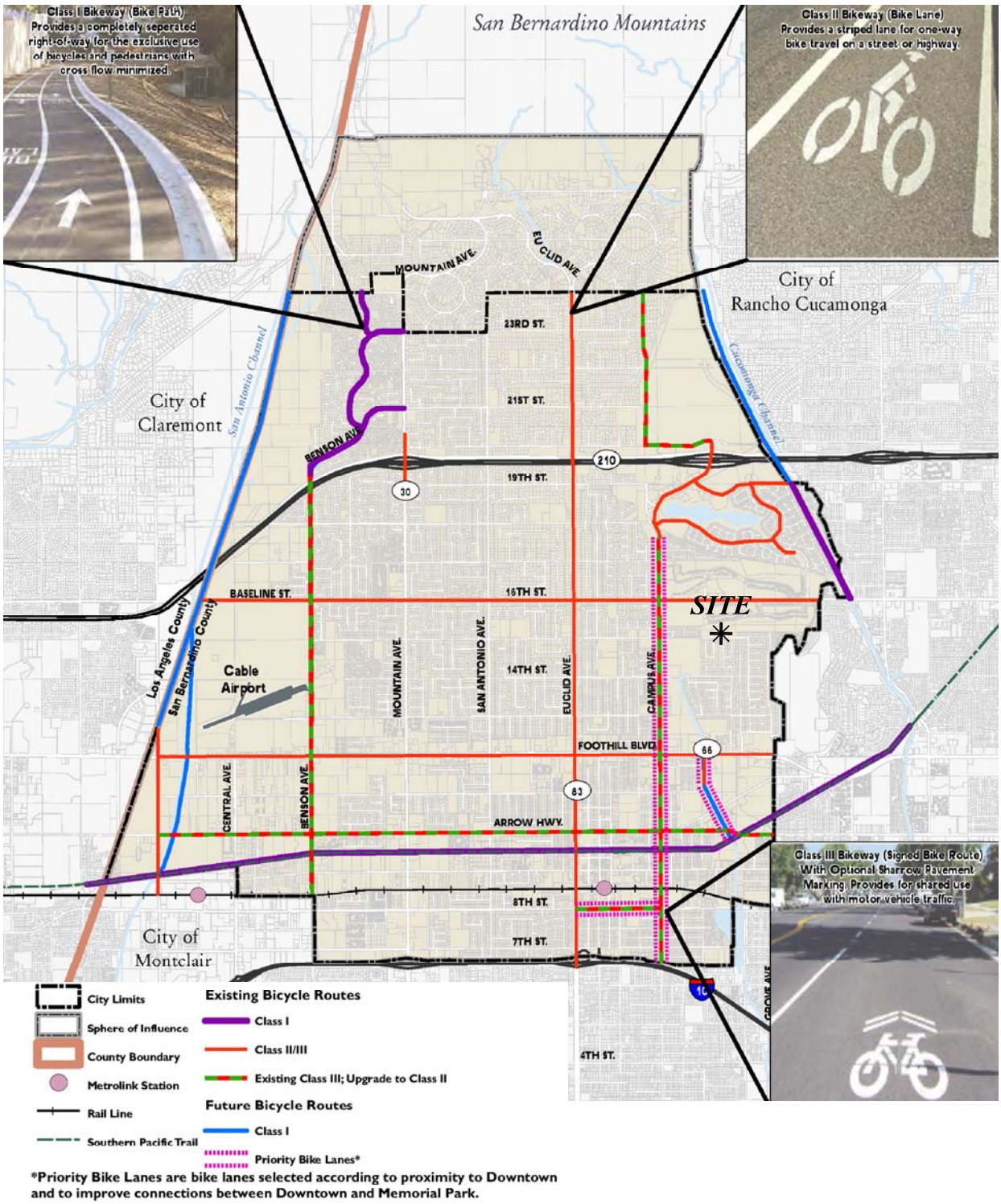
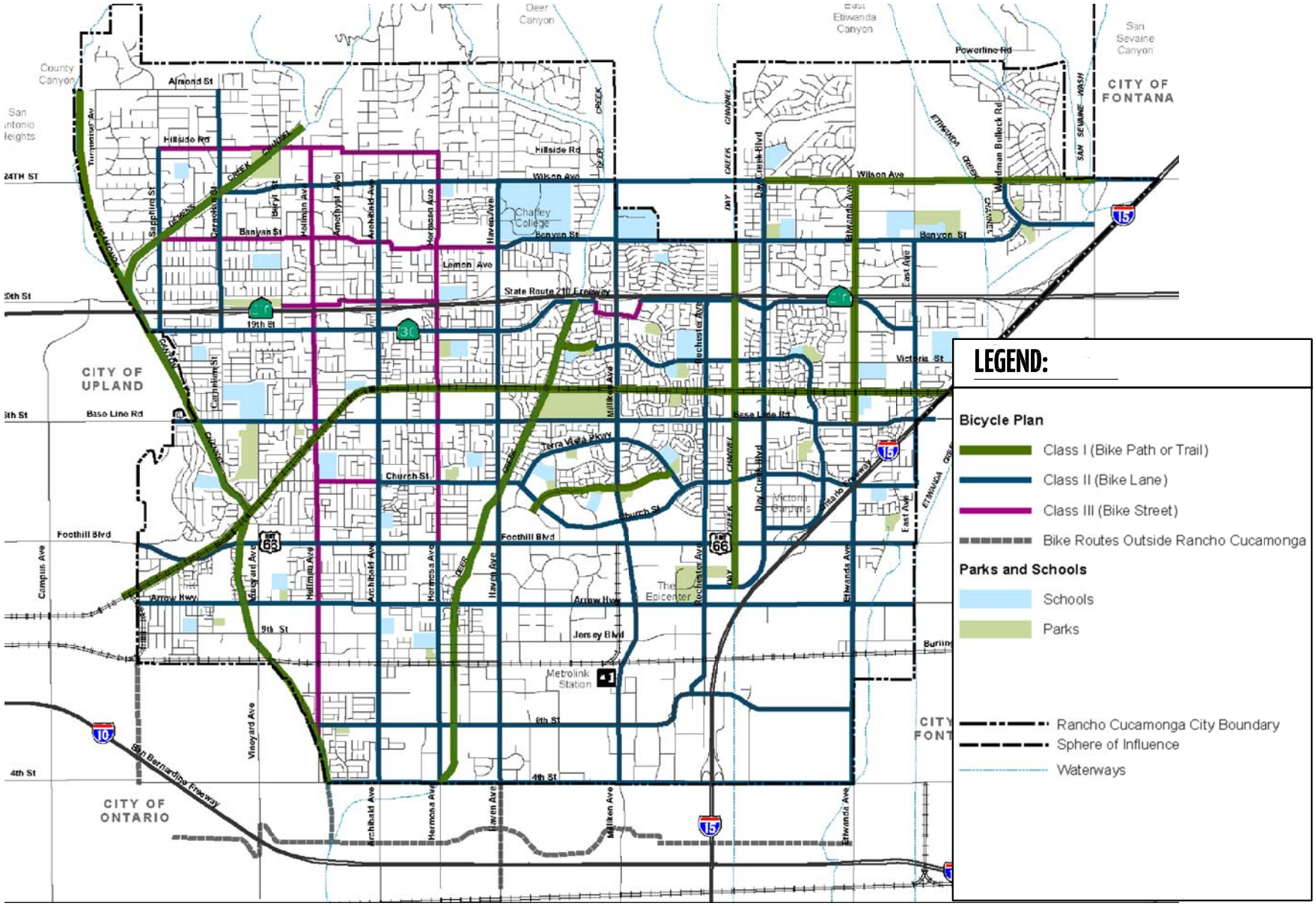


EXHIBIT 3-7: CITY OF RANCHO CUCAMONGA BIKE ROUTES



URBAN CROSSROADS

EXHIBIT 3-8: CITY OF UPLAND PARKS, TRAILS AND RECREATION FACILITIES

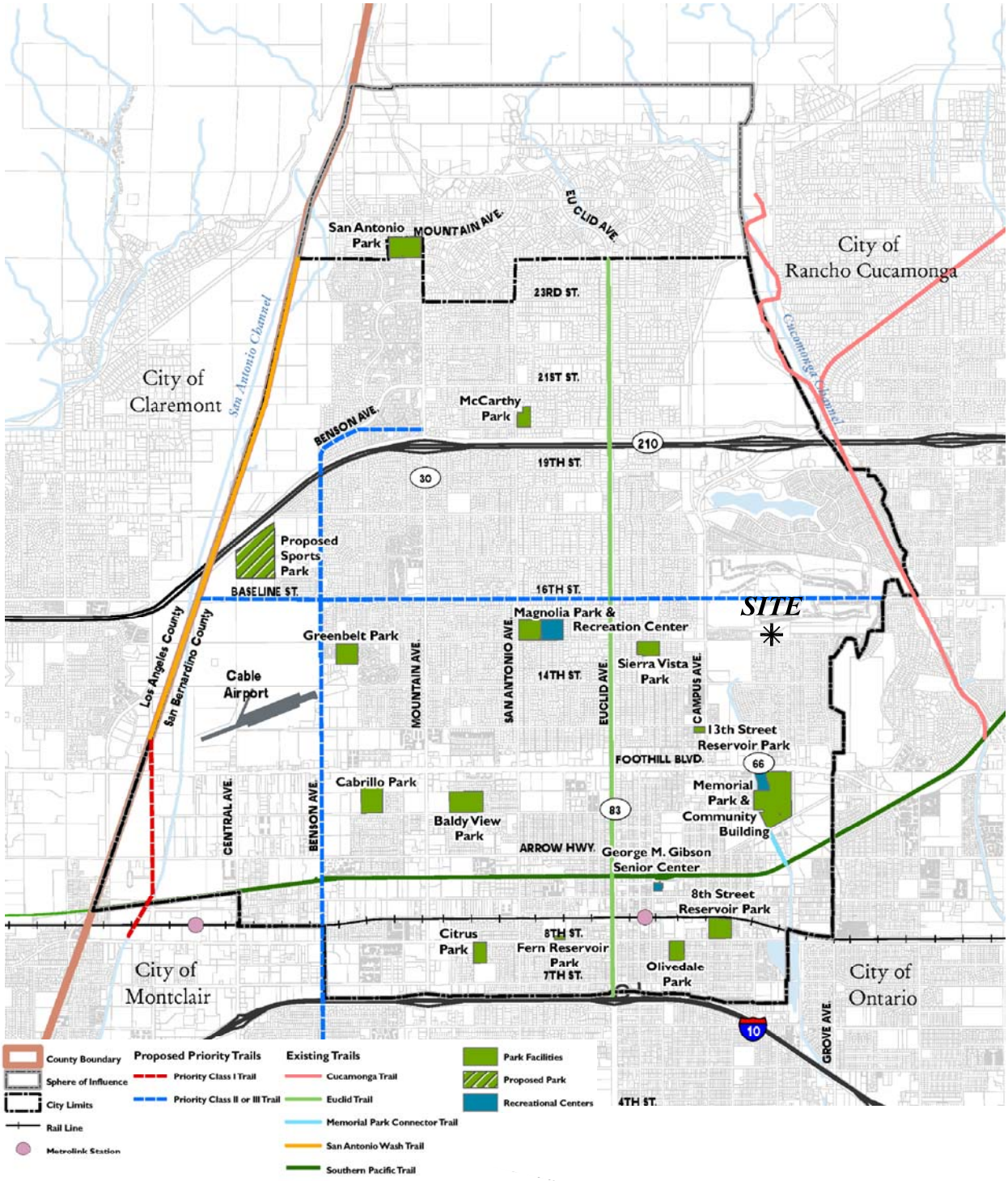


EXHIBIT 3-9: CITY OF UPLAND PEDESTRIAN FACILITIES

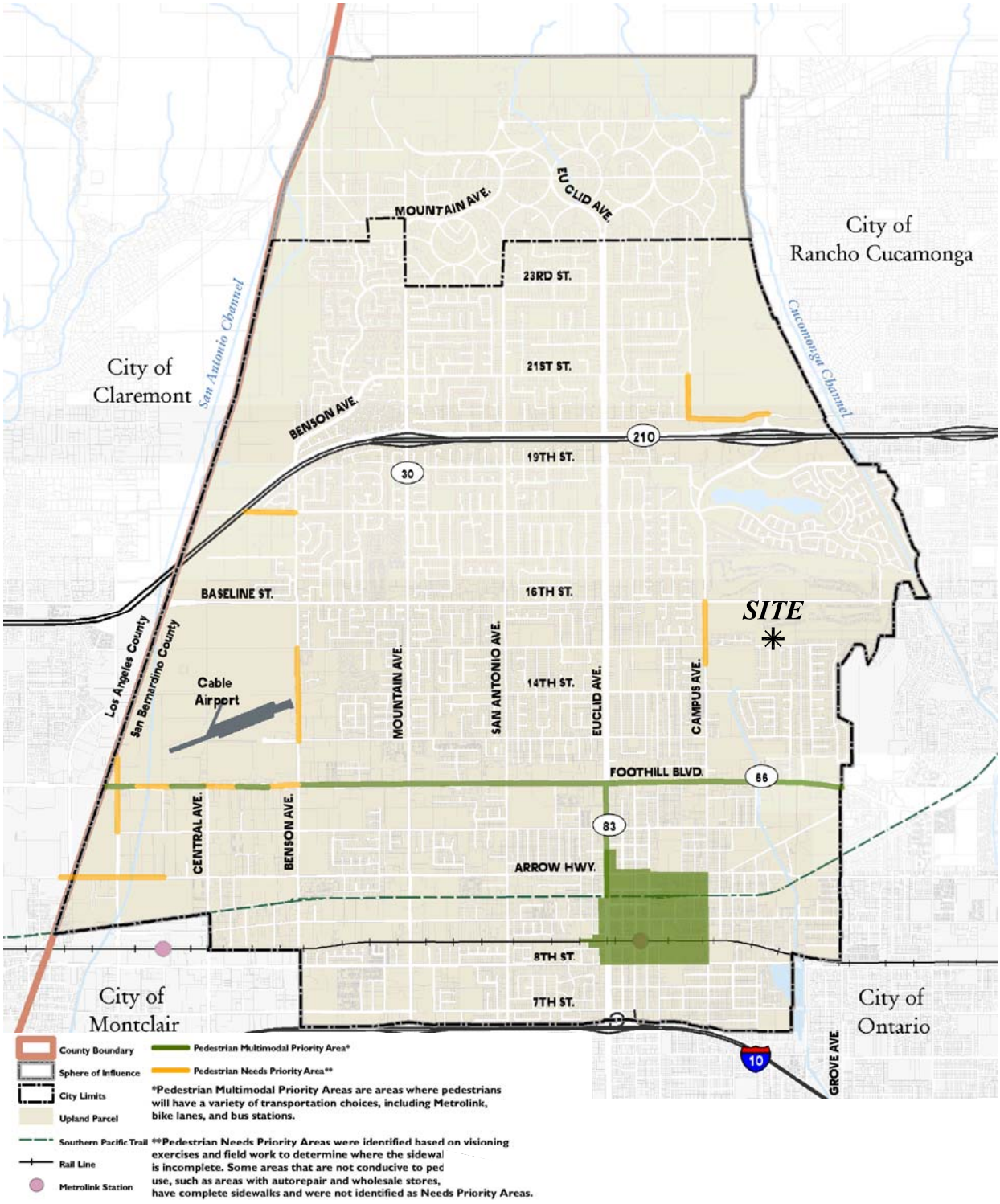


EXHIBIT 3-10: EXISTING PEDESTRIAN FACILITIES

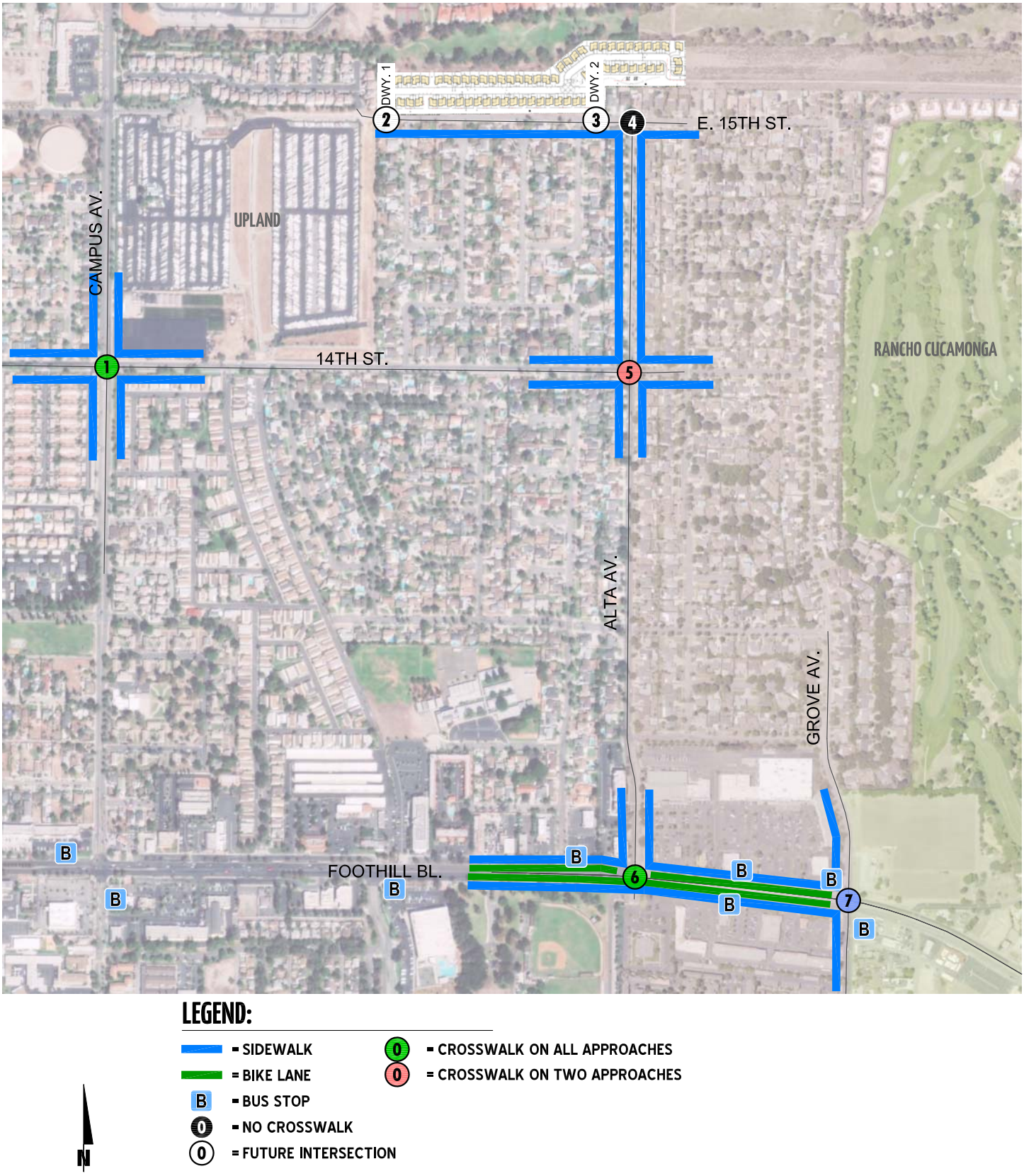
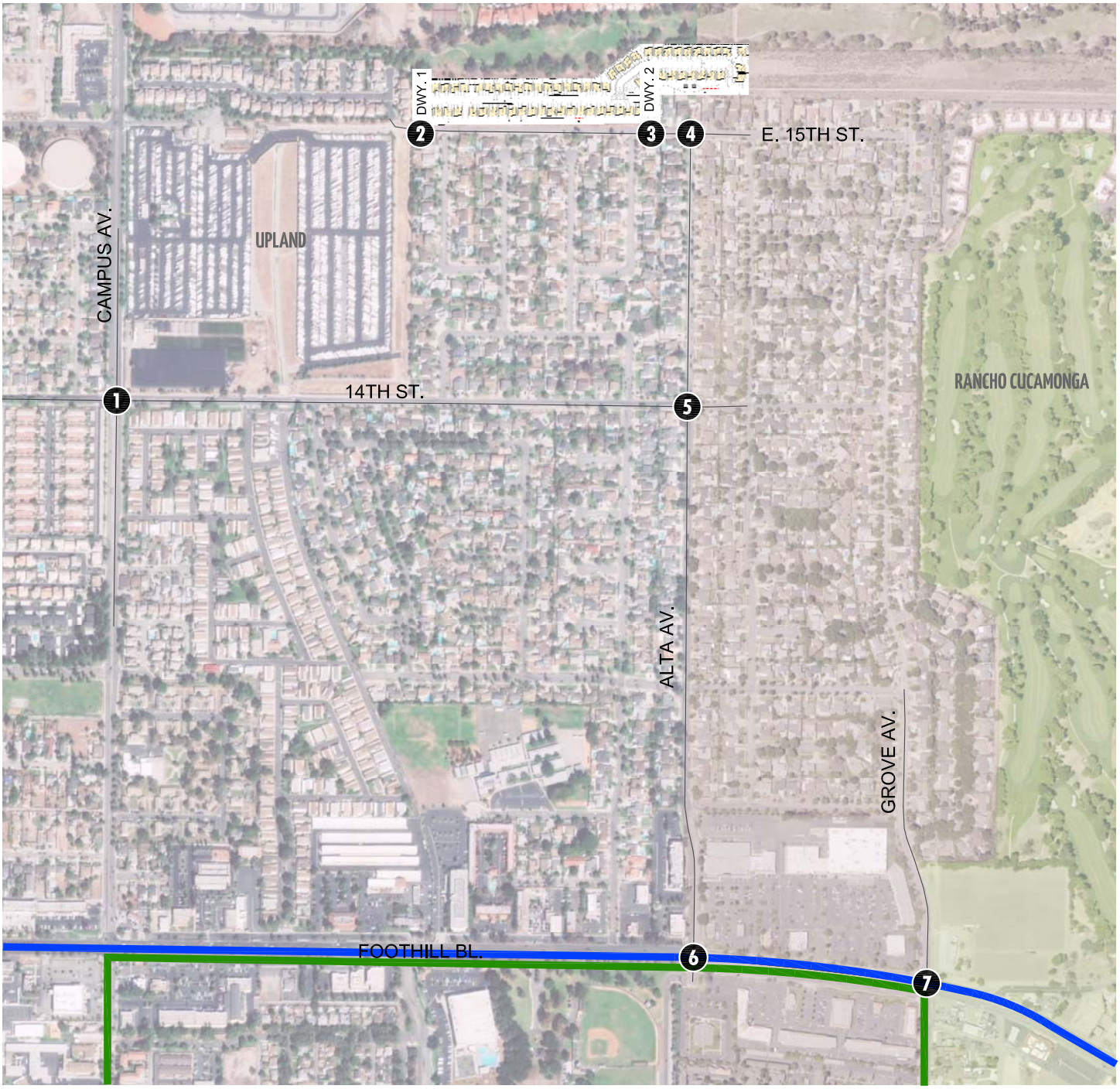


EXHIBIT 3-11: EXISTING TRANSIT ROUTES



LEGEND:

- = OMNITRANS ROUTE 86
- = OMNITRANS ROUTE 66

N

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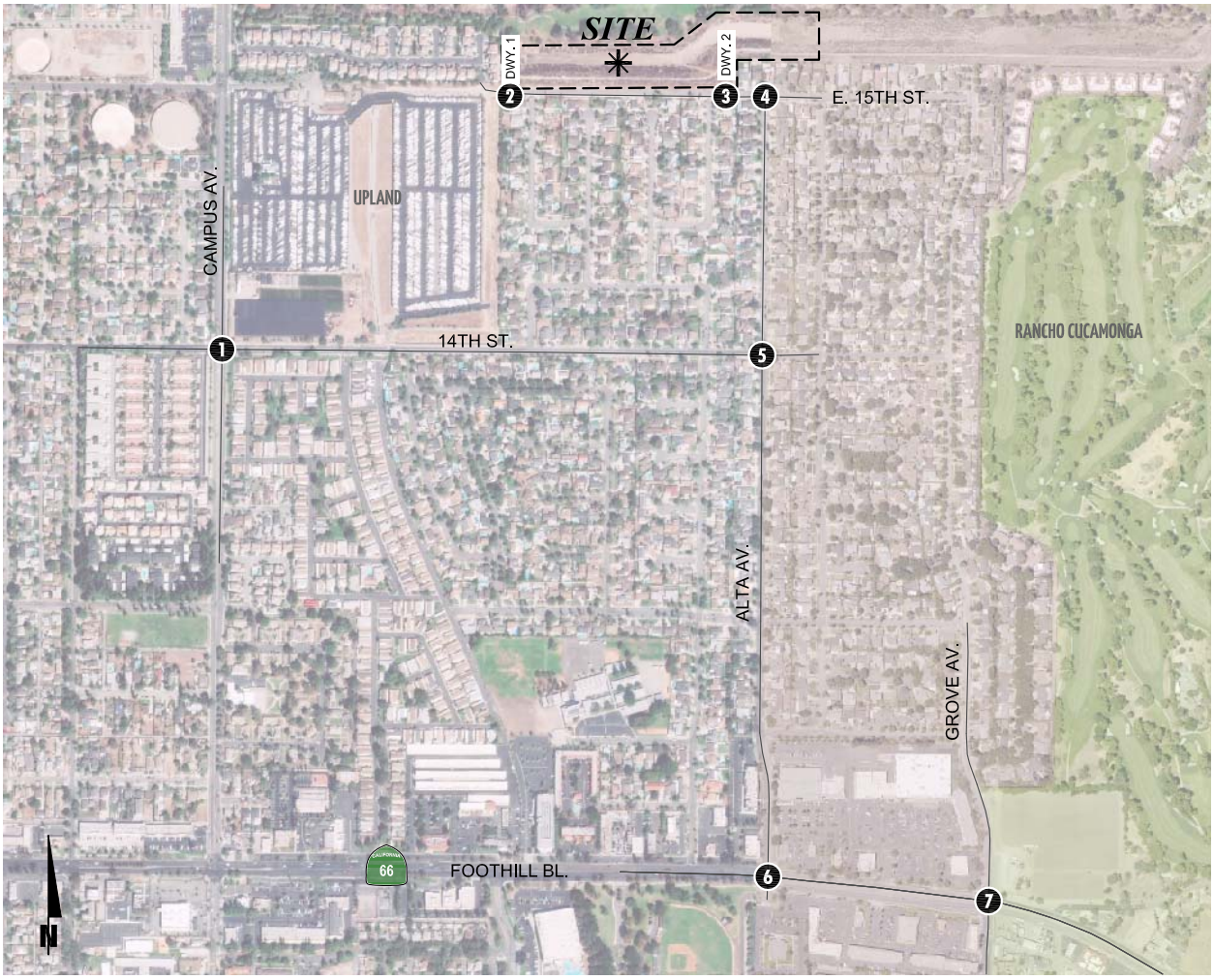
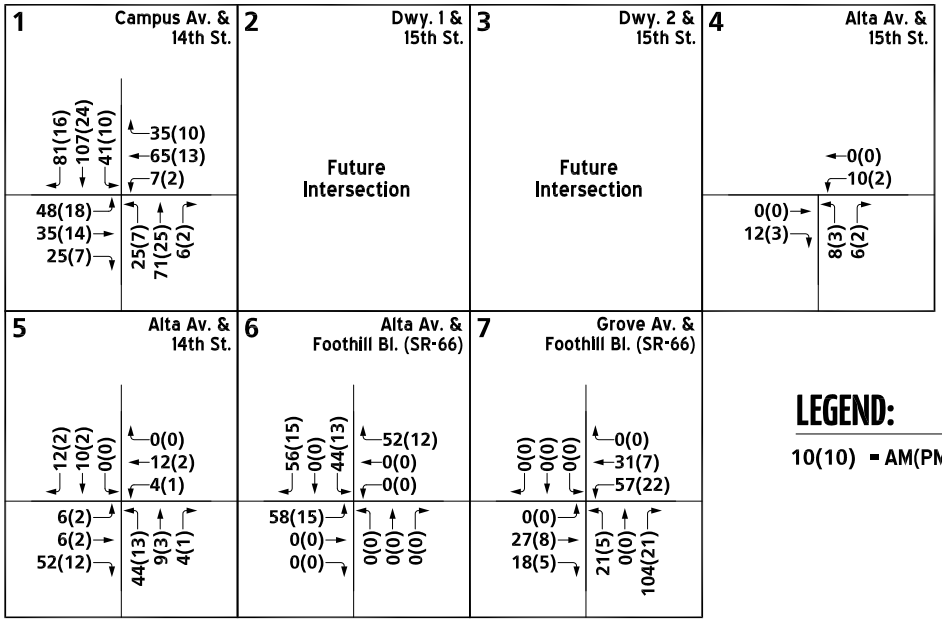
EXHIBIT 3-12: SCHOOLS ONLY TRAFFIC VOLUMES





LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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.

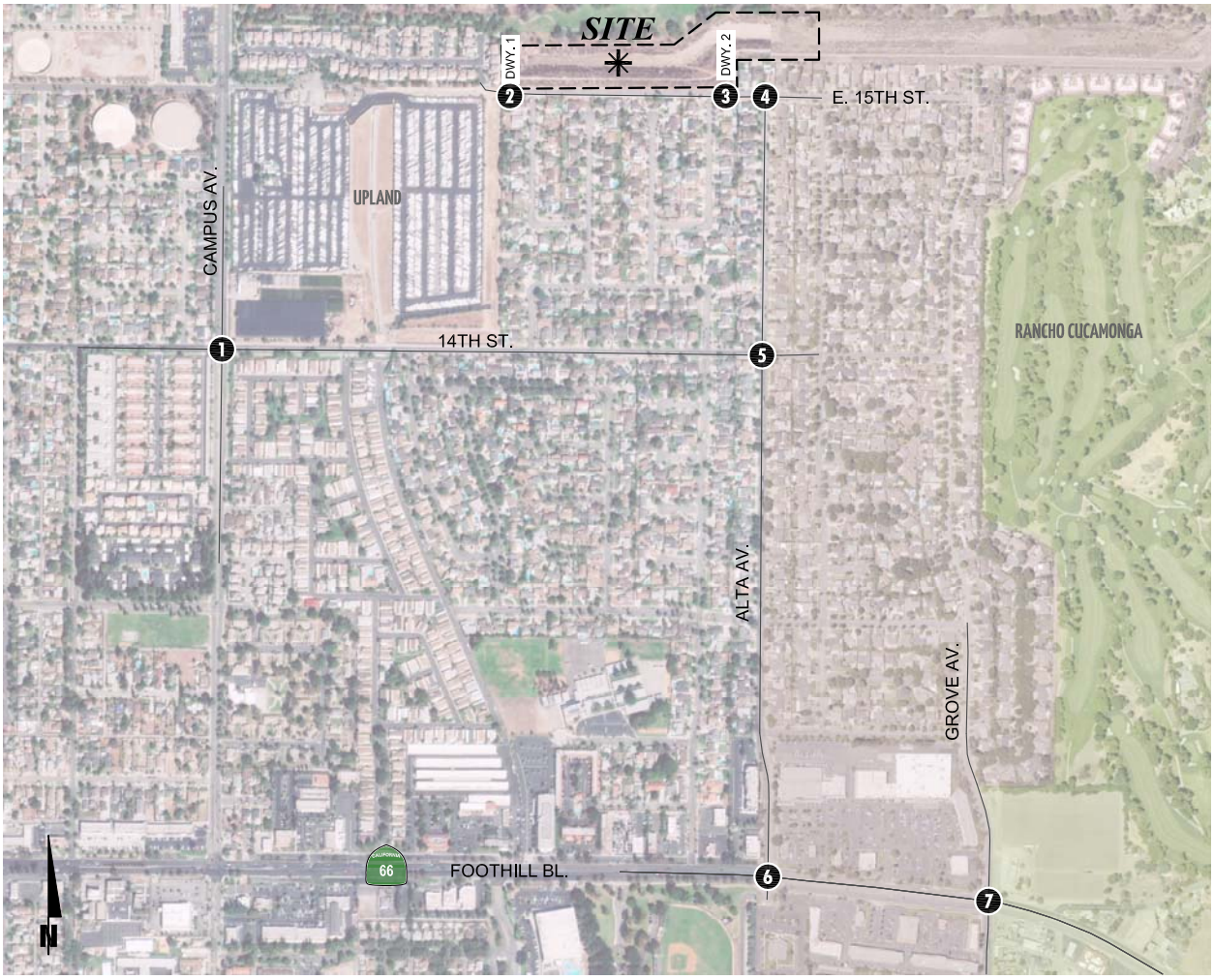
3.7 EXISTING (2018) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

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.

98(56)	588(535)	111(133)
73(93)	65(121)	40(20)
32(25)	413(764)	25(51)
132(109)	129(73)	38(34)

2 Dwy. 1 & 15th St.

Future Intersection

3 Dwy. 2 & 15th St.

Future Intersection

4 Alta Av. & 15th St.

3(6)	14(3)	9(7)
13(11)	4(7)	18(7)

5 Alta Av. & 14th St.

28(13)	11(3)	3(1)
11(19)	63(109)	65(37)
57(42)	12(10)	4(3)
2(3)	90(101)	7(2)

6 Alta Av. & Foothill Bl. (SR-66)

100(106)	8(11)	67(75)
125(94)	524(1319)	20(18)
11(13)	6(9)	5(18)
97(38)	731(838)	13(15)

7 Grove Av. & Foothill Bl. (SR-66)

13(21)	80(134)	67(149)
12(24)	398(1116)	139(211)
165(184)	69(156)	150(210)
57(87)	696(708)	130(96)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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EXHIBIT 3-14: EXISTING (2018) SUMMARY OF LOS

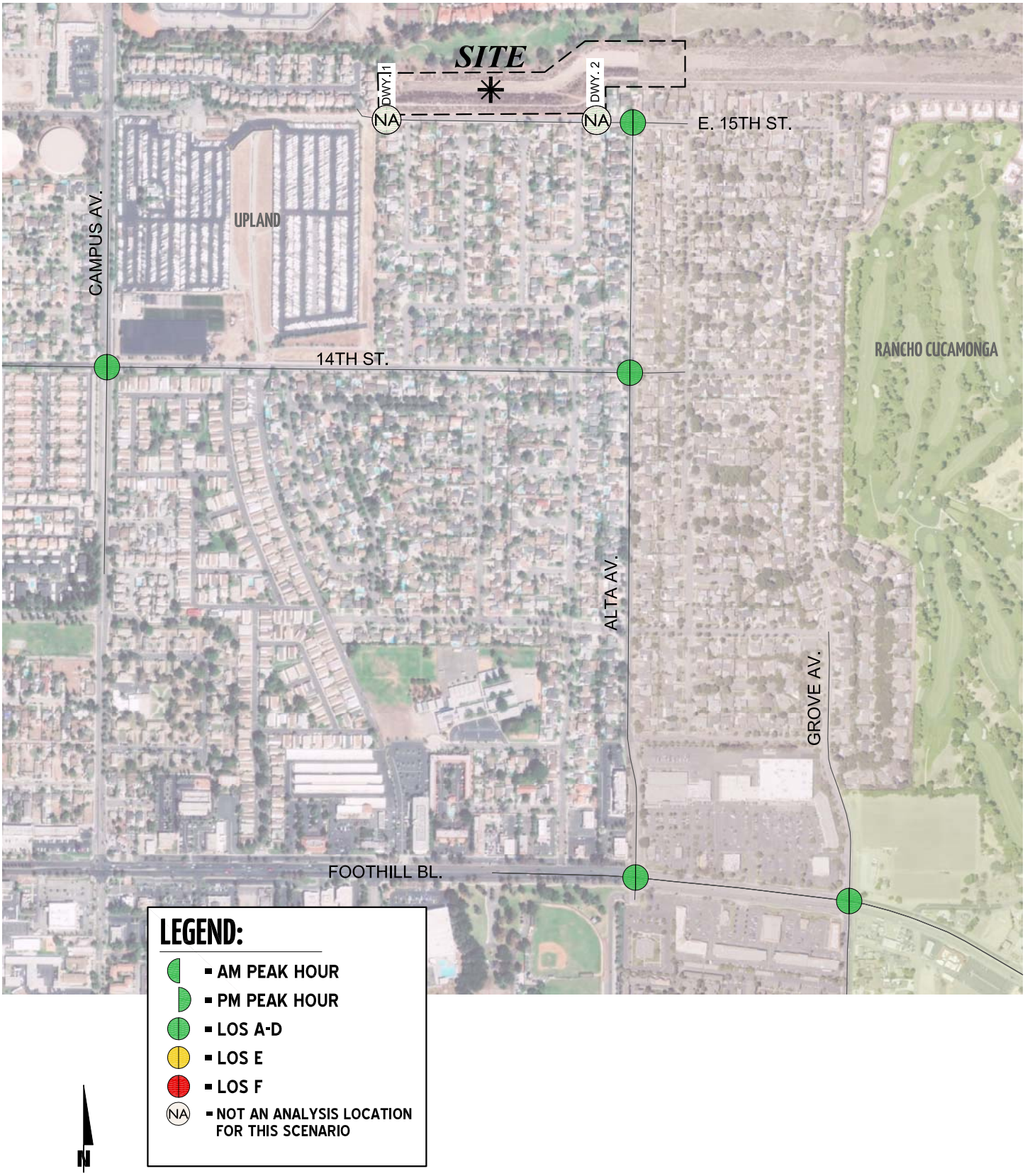


Table 3-1

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

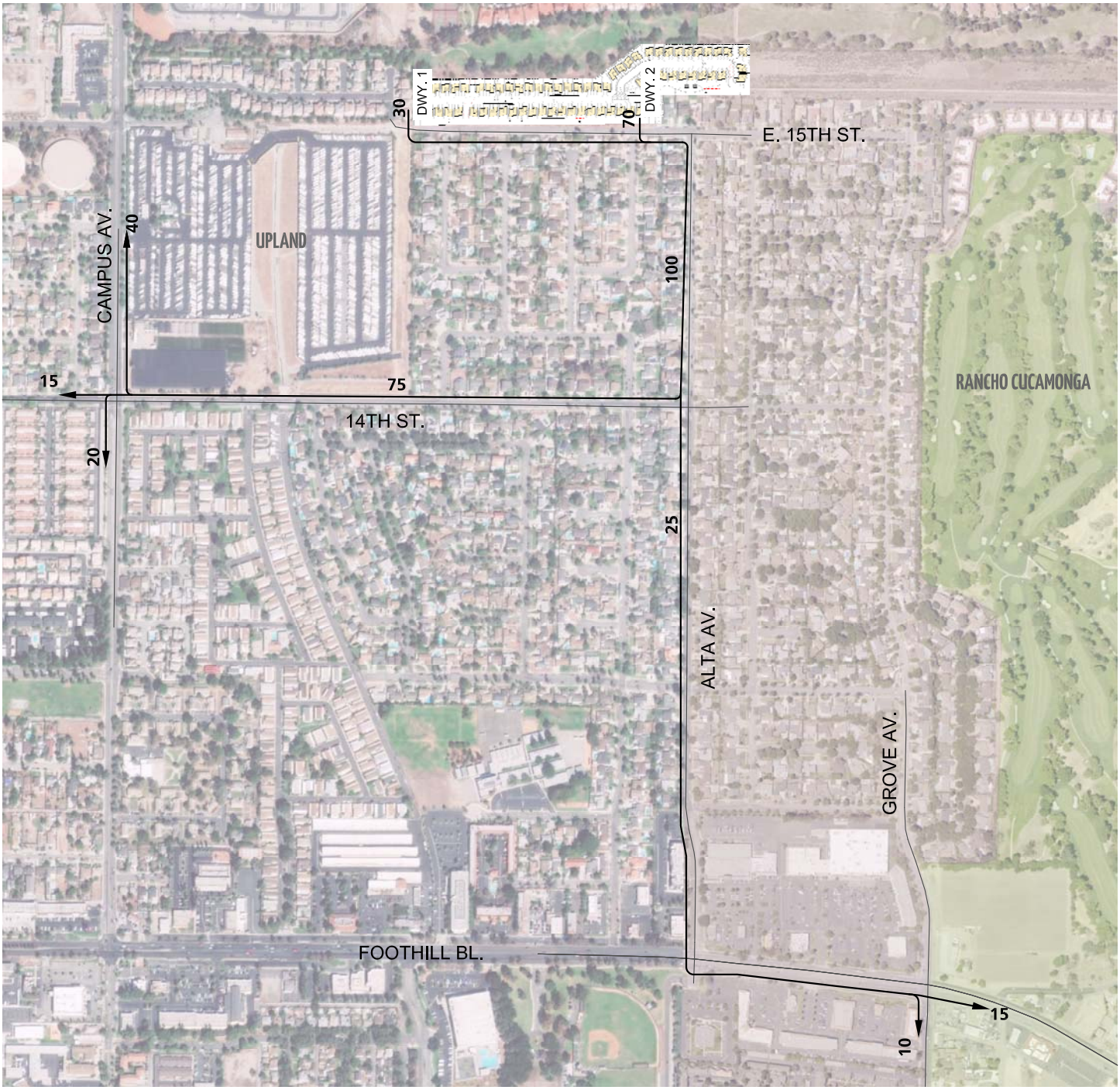
Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Project Trip Generation Rates									
Single Family Residential Detached	210	DU	0.19	0.56	0.74	0.62	0.37	0.99	9.44

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

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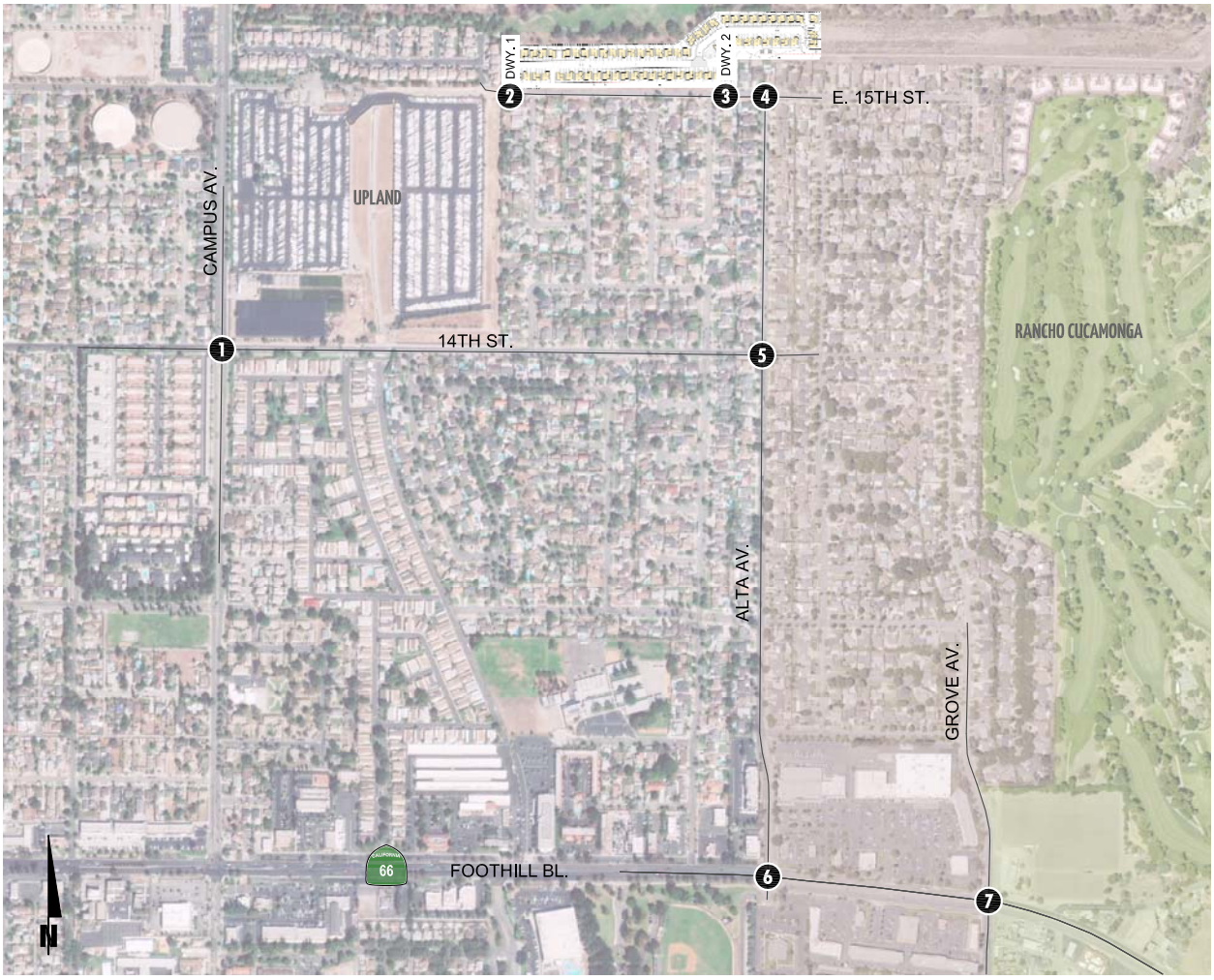
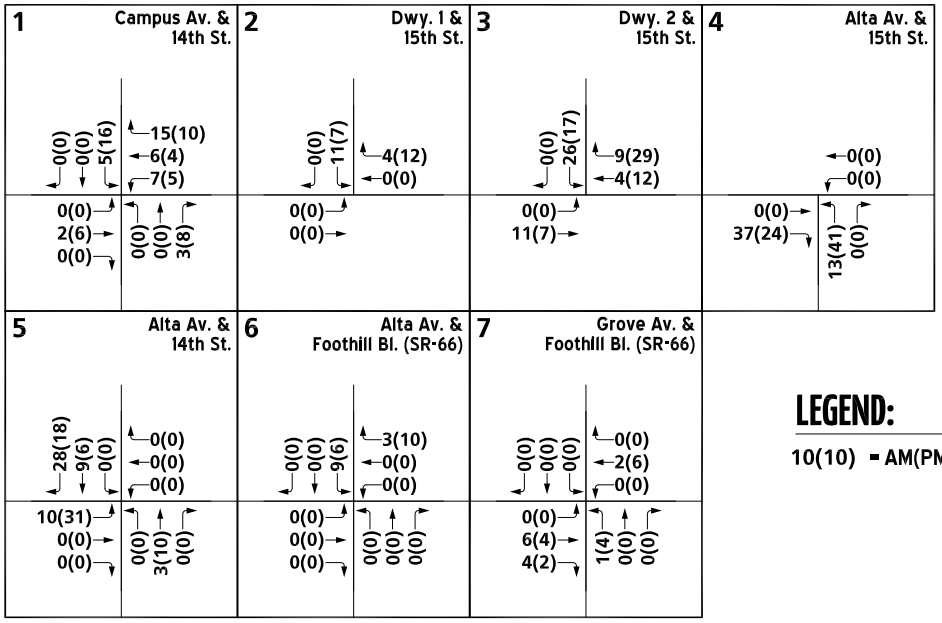
URBAN CROSSROADS

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

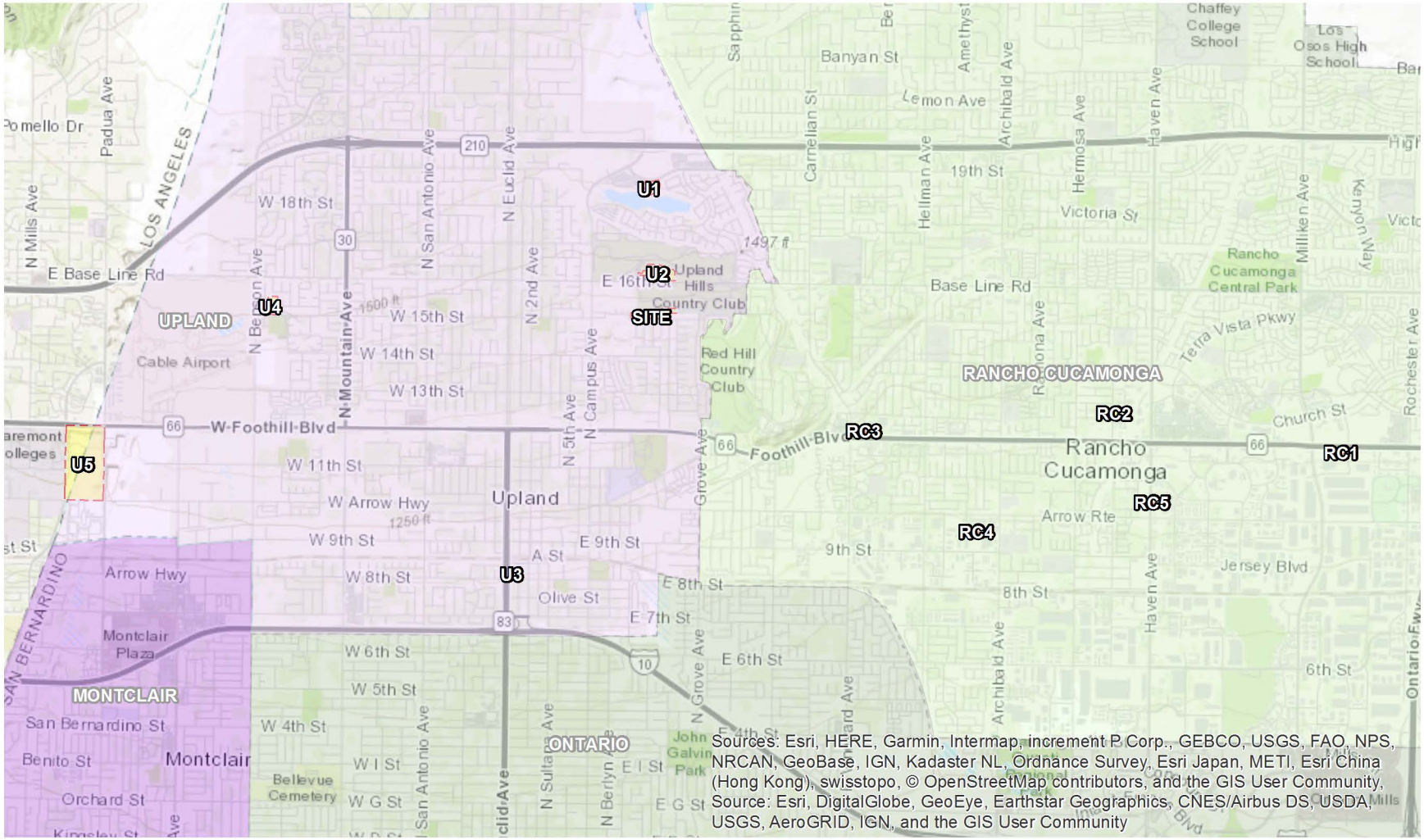
California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. The cumulative project list includes known and 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



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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.

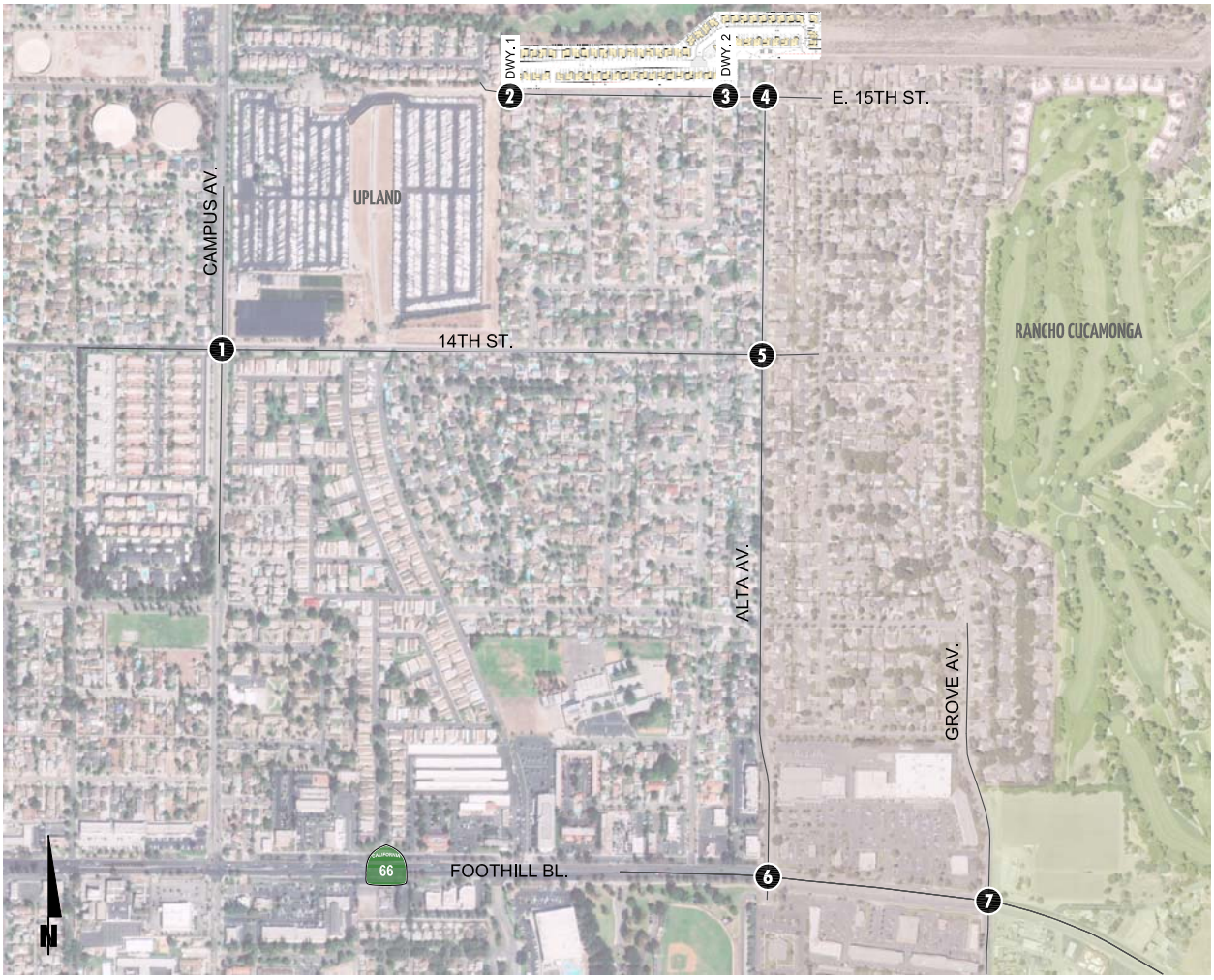
5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

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.

98(56)	588(535)	116(149)
147(119)	135(77)	45(39)
73(93)	67(127)	40(20)
32(25)	413(764)	28(59)

2 Dwy. 1 & 15th St.

0(0)	11(7)	4(12)
3(7)		
0(0)		
3(3)		

3 Dwy. 2 & 15th St.

0(0)	26(17)	9(29)
17(26)		
0(0)		
28(16)		

4 Alta Av. & 15th St.

4(7)	18(7)	
3(6)	51(27)	
22(48)	13(11)	

5 Alta Av. & 14th St.

56(31)	20(9)	3(1)
2(3)	90(101)	7(2)
21(50)	63(109)	65(37)
57(42)	15(20)	4(3)

6 Alta Av. & Foothill Bl. (SR-66)

100(106)	8(11)	76(81)
100(48)	731(838)	13(15)
125(94)	524(1319)	20(18)
11(13)	6(9)	5(18)

7 Grove Av. & Foothill Bl. (SR-66)

13(21)	80(134)	67(149)
57(87)	698(714)	130(96)
12(24)	404(1120)	143(213)
166(188)	69(156)	150(210)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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URBAN CROSSROADS

EXHIBIT 5-2: E+P SUMMARY OF LOS

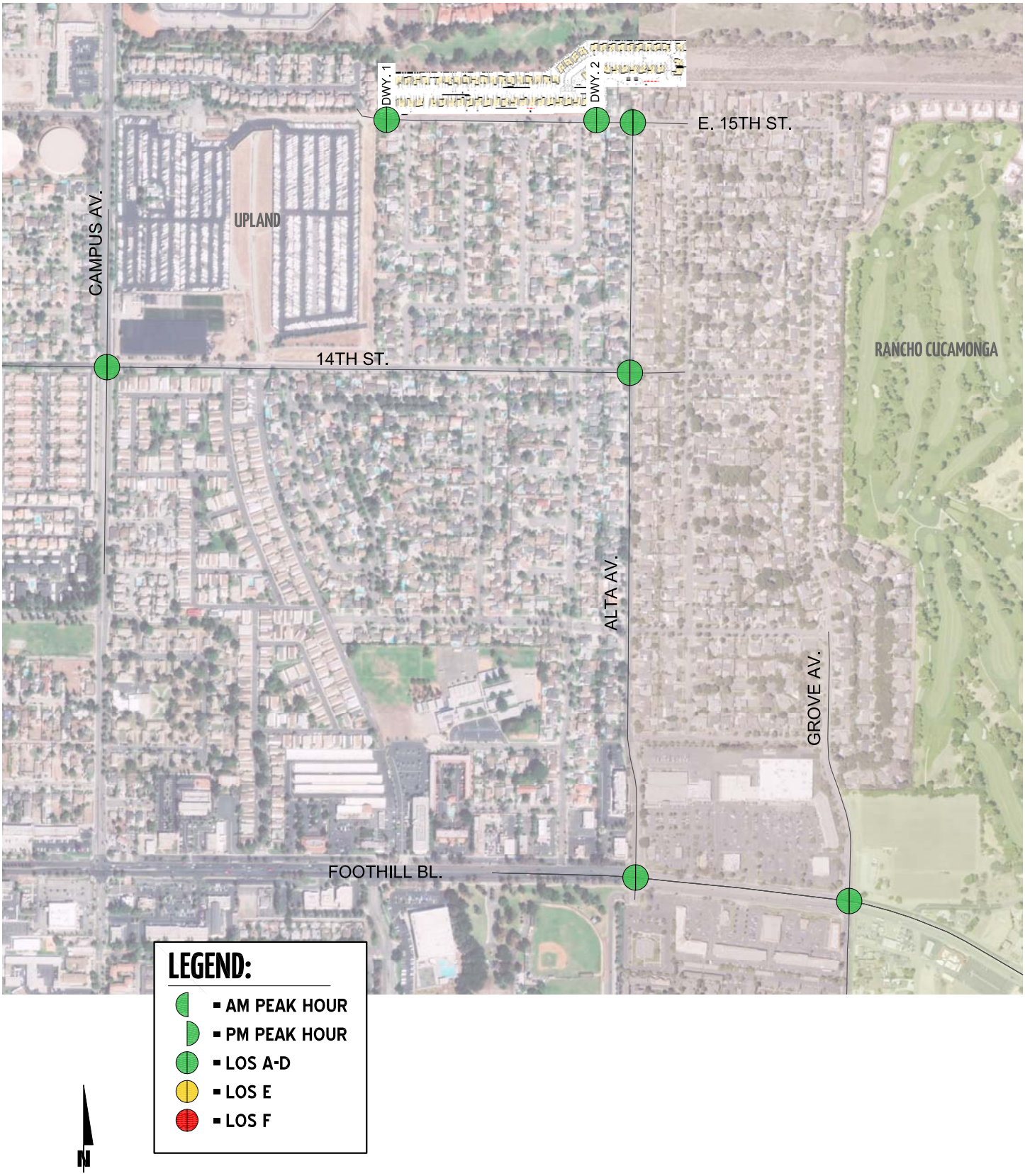


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2018) Delay[1] (secs.) AM	Existing (2018) Delay[1] (secs.) PM	Existing (2018) Level of Service AM	Existing (2018) Level of Service PM	E+P Delay[1] (secs.) AM	E+P Delay[1] (secs.) PM	E+P Level of Service AM	E+P Level of Service 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.

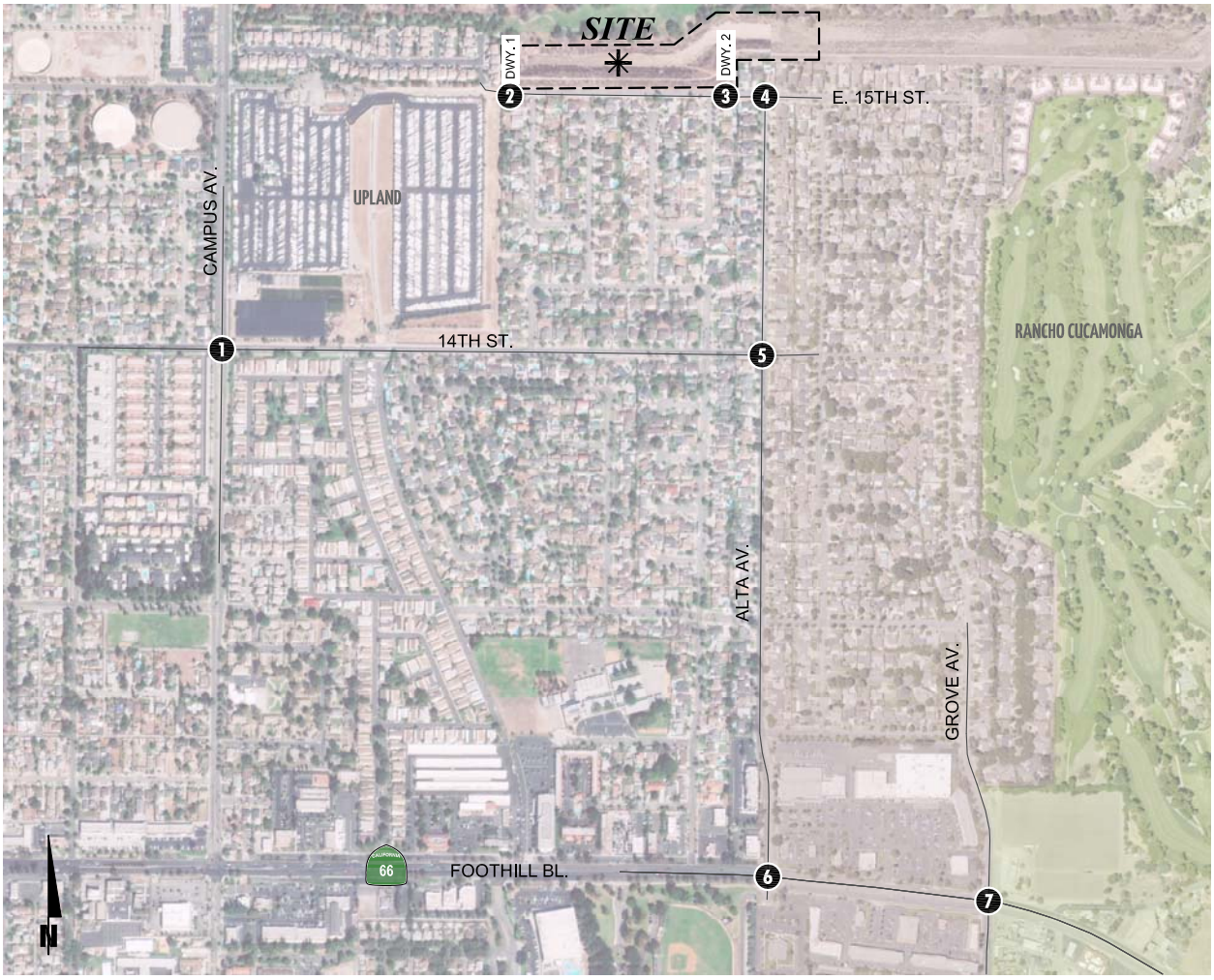
6.4 INTERSECTION OPERATIONS ANALYSIS

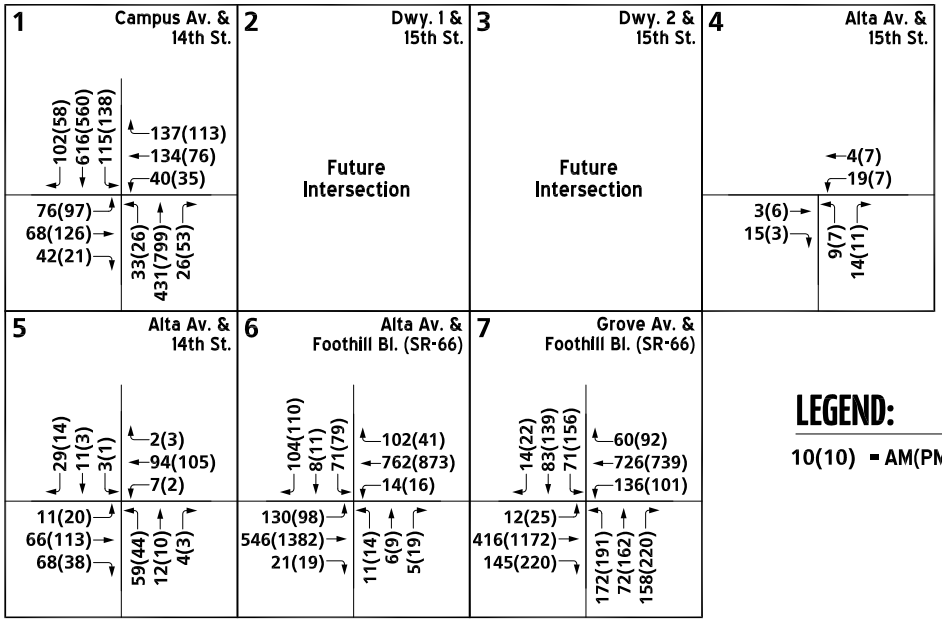
Opening Year Cumulative (2020) Without and With Project peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 6-1 for both Opening 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

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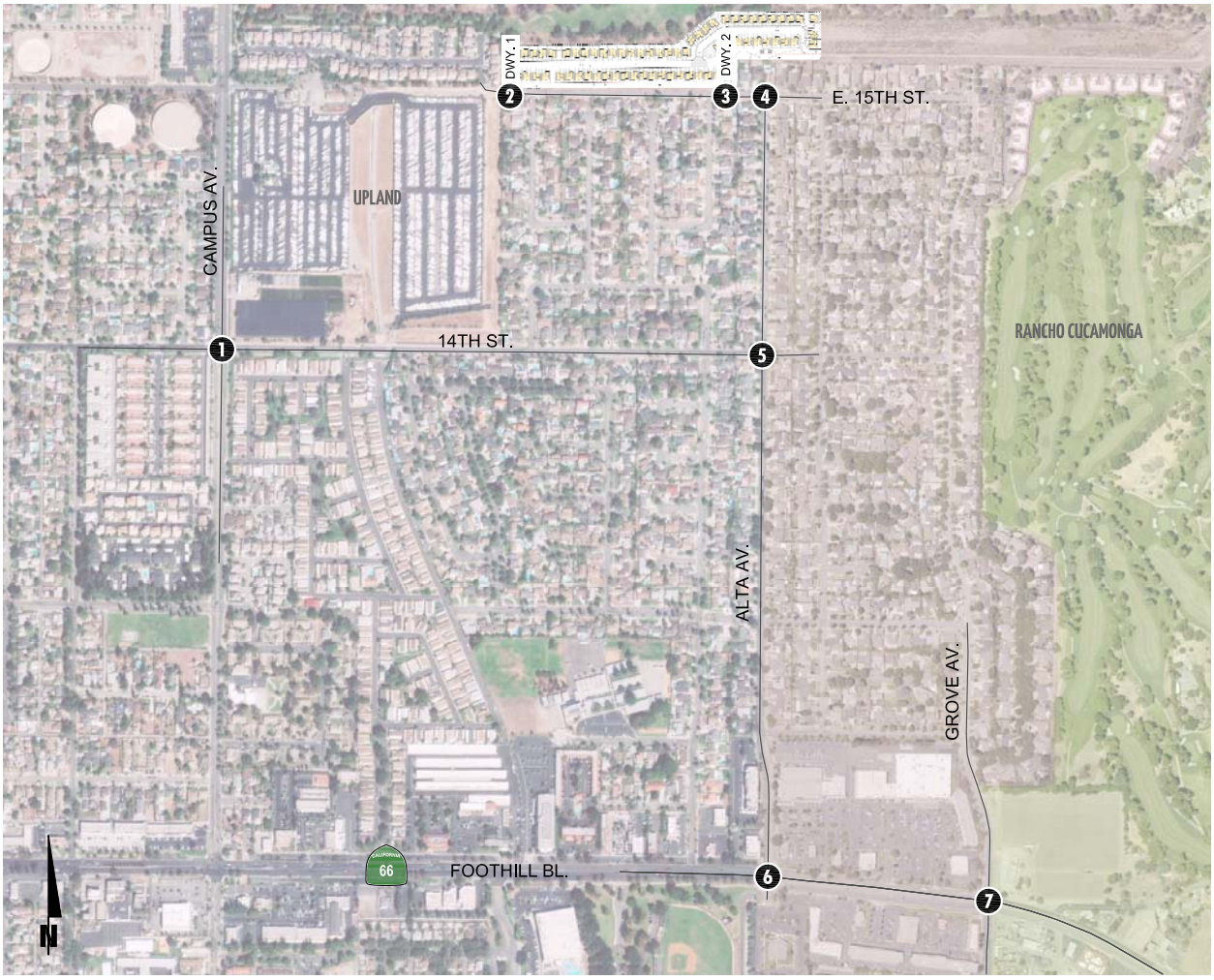
EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES



1 Campus Av. & 14th St.

102(58) 616(560) 120(154) — 152(123) 140(80) 47(40)

76(97) 70(132) 42(21) — 33(26) 431(799) 29(61)

2 Dwy. 1 & 15th St.

0(0) 11(7) — 4(12) 3(7)

0(0) 3(3)

3 Dwy. 2 & 15th St.

0(0) 26(17) — 9(29) 18(27)

0(0) 29(16)

4 Alta Av. & 15th St.

4(7) 19(7)

3(6) 52(27) — 22(48) 14(11)

5 Alta Av. & 14th St.

57(32) 20(9) 3(1) — 2(3) 94(105) 7(2)

21(51) 66(113) 68(38) — 59(44) 15(20) 4(3)

6 Alta Av. & Foothill Bl. (SR-66)

104(110) 8(11) 80(85) — 105(51) 762(873) 14(16)

130(98) 546(1382) 21(19) — 11(14) 6(9) 5(19)

7 Grove Av. & Foothill Bl. (SR-66)

14(22) 83(139) 71(156) — 60(92) 728(745) 136(101)

12(25) 422(1176) 149(222) — 173(195) 72(162) 158(220)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT SUMMARY OF LOS

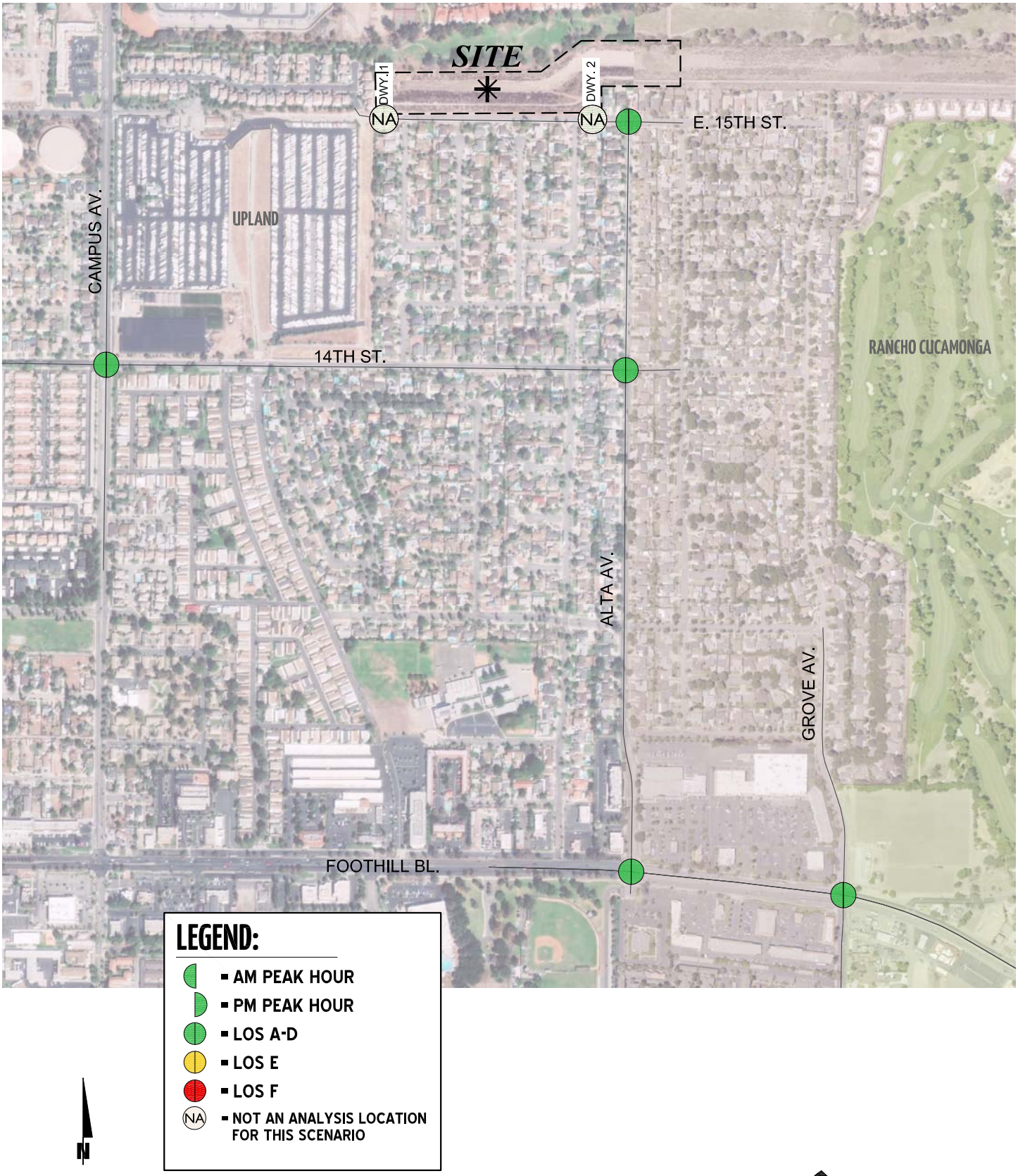

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Table 6-1

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 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 6.4 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 6-2 summarizes the 95th percentile queues for the left turn lanes at Campus Avenue and 14th Street. As shown in Table 6-2, 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. Although the 95th 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

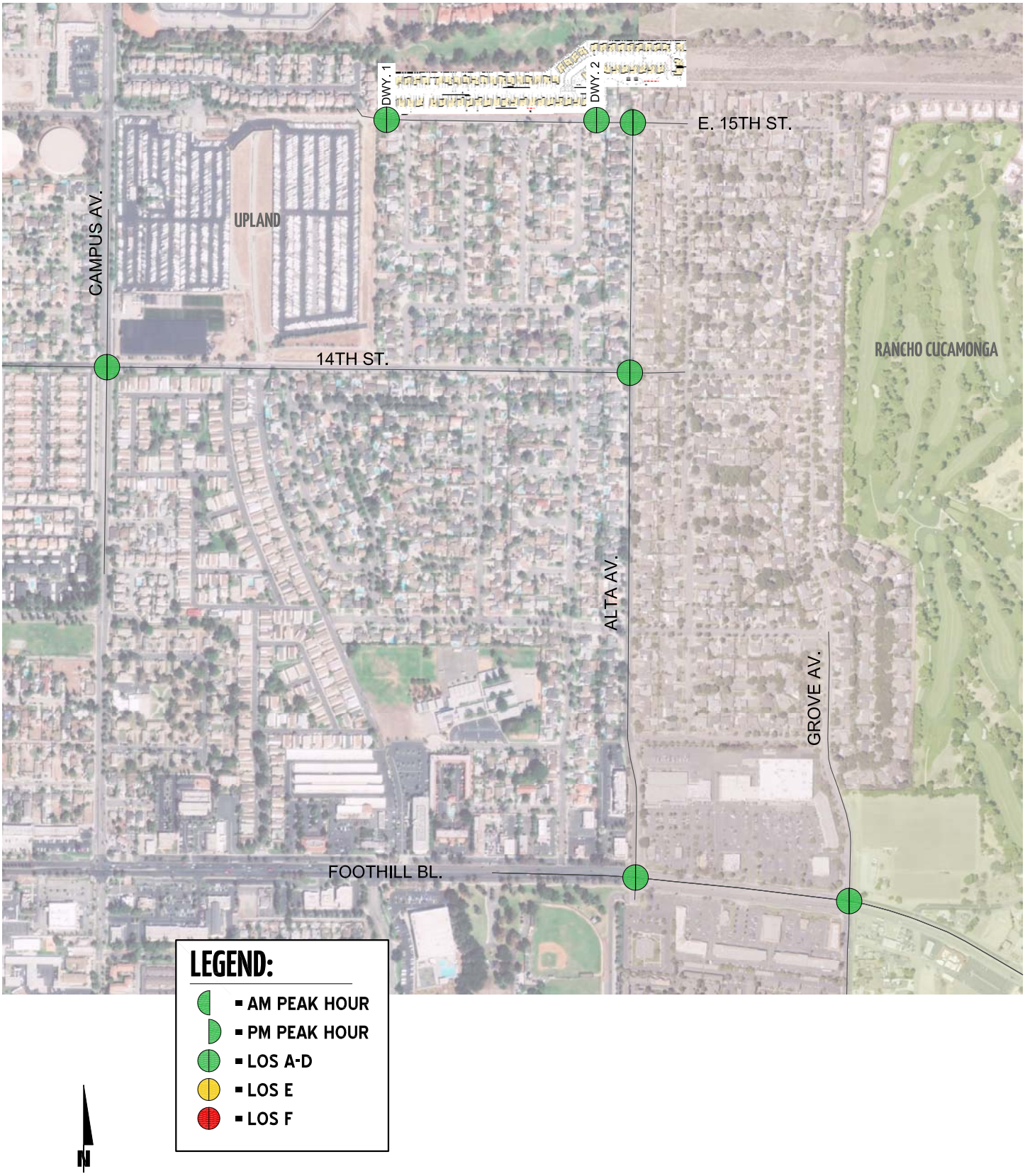

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Table 6-2

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.

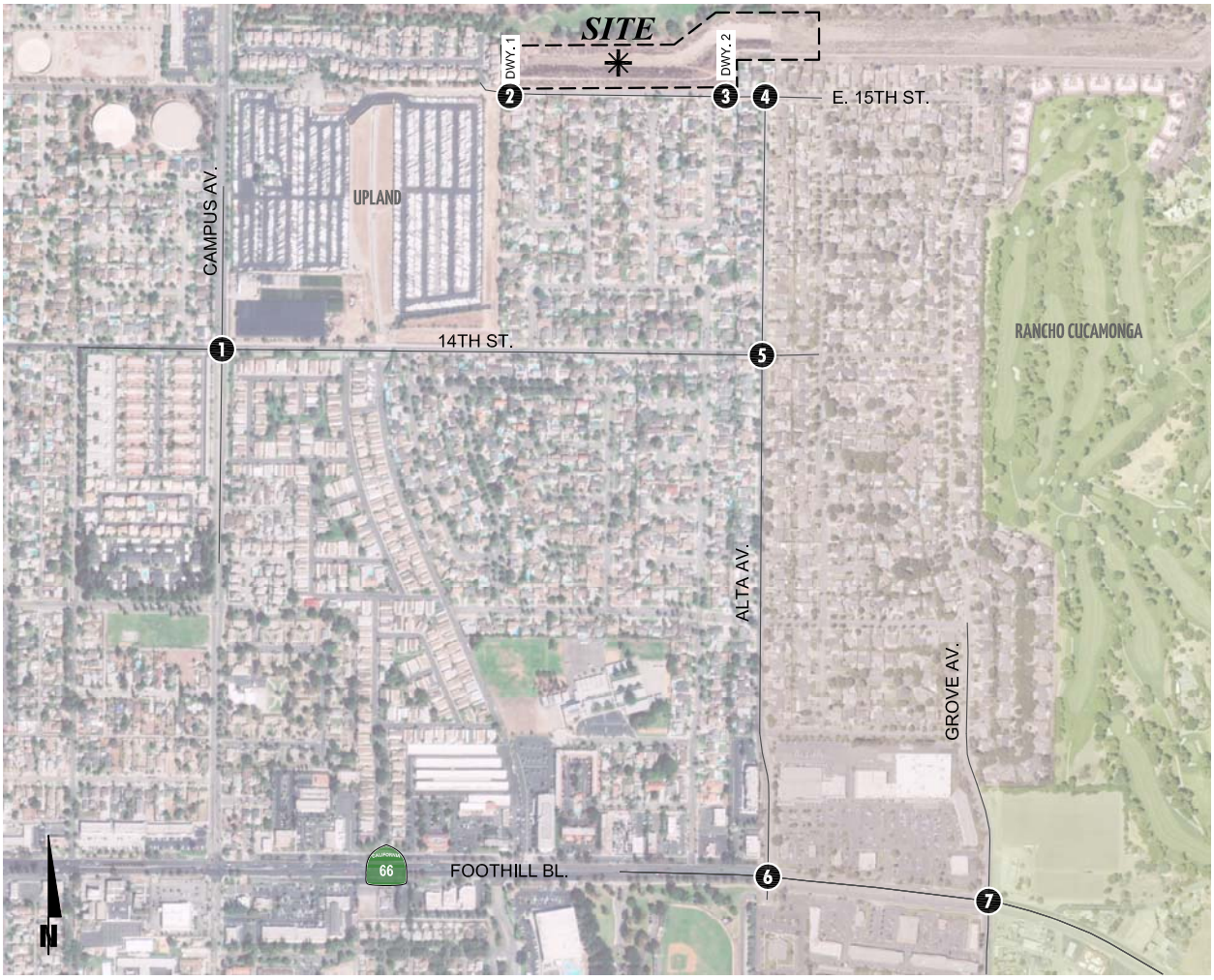
7.4 INTERSECTION OPERATIONS ANALYSIS

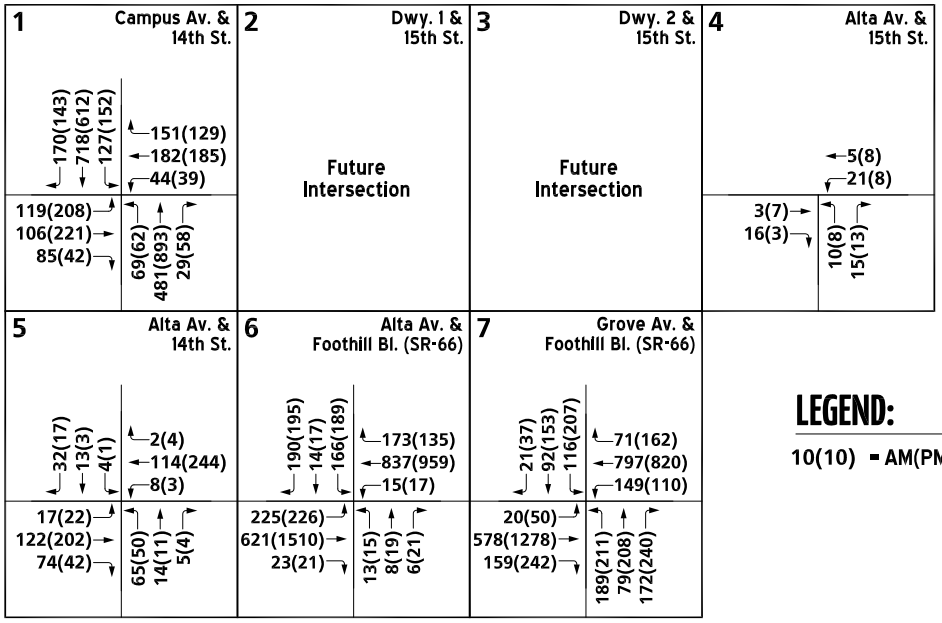
Horizon Year (2040) Without and With Project peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 7-1 for both Horizon Year (2040) 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

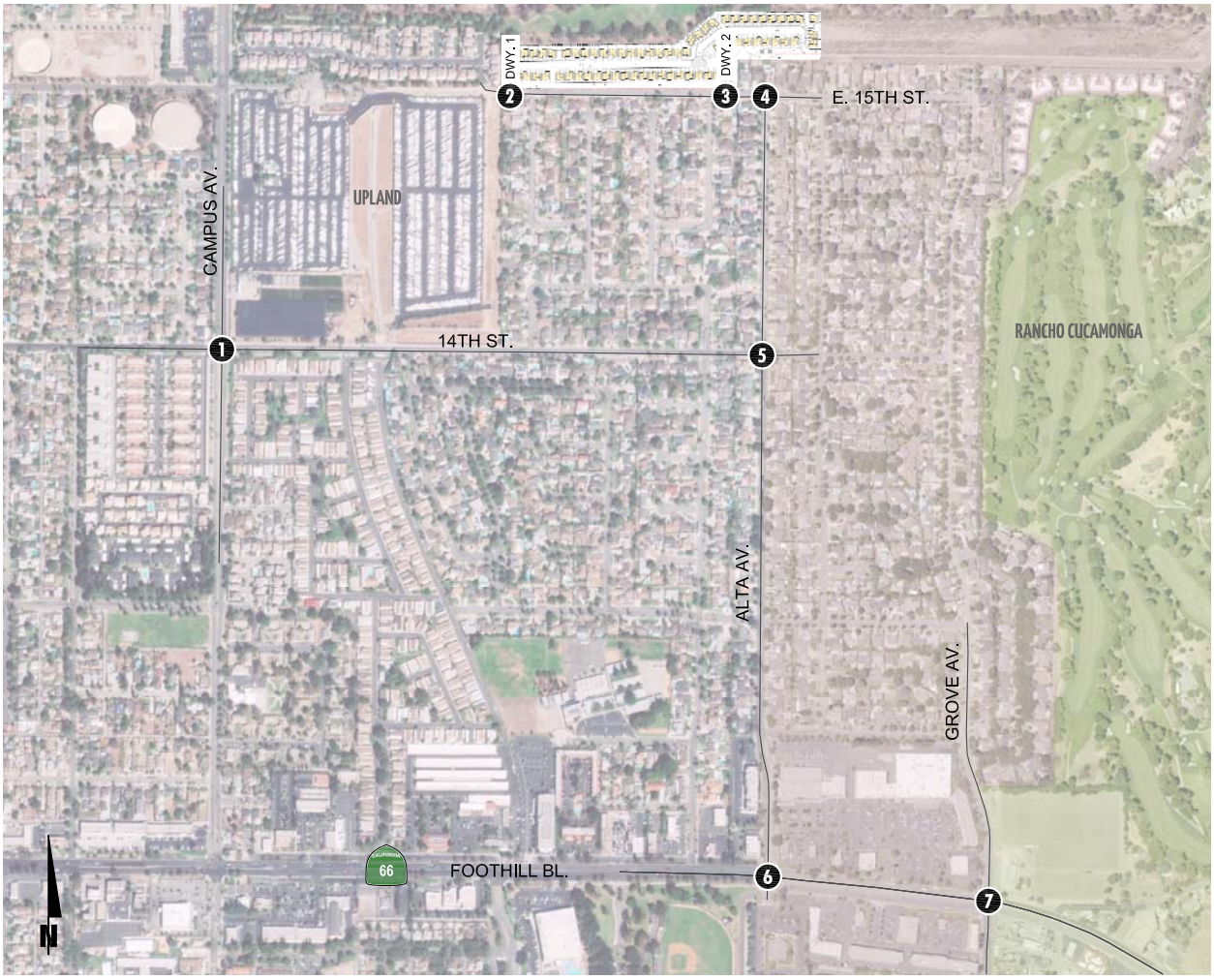




LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES



1 Campus Av. & 14th St.

170(143) 718(612) 132(168) — 166(139) 188(189) 51(44)

119(208) 108(227) 85(42) — 69(62) 481(893) 32(66)

2 Dwy. 1 & 15th St.

0(0) 11(7) — 4(12) 3(8)

0(0) 3(3)

3 Dwy. 2 & 15th St.

0(0) 26(17) — 9(29) 19(28)

0(0) 30(17)

4 Alta Av. & 15th St.

5(8) 21(8)

3(7) 53(27) — 23(49) 15(13)

5 Alta Av. & 14th St.

60(35) 22(9) 4(1) — 2(4) 114(244) 8(3)

27(53) 122(202) 74(42) — 65(50) 17(21) 5(4)

6 Alta Av. & Foothill Bl. (SR-66)

190(195) 14(17) 175(195) — 176(145) 837(959) 15(17)

225(226) 621(1510) 23(21) — 13(15) 8(19) 6(21)

7 Grove Av. & Foothill Bl. (SR-66)

21(37) 92(153) 116(207) — 71(162) 799(826) 149(110)

20(50) 584(1282) 163(244) — 190(215) 79(208) 172(240)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

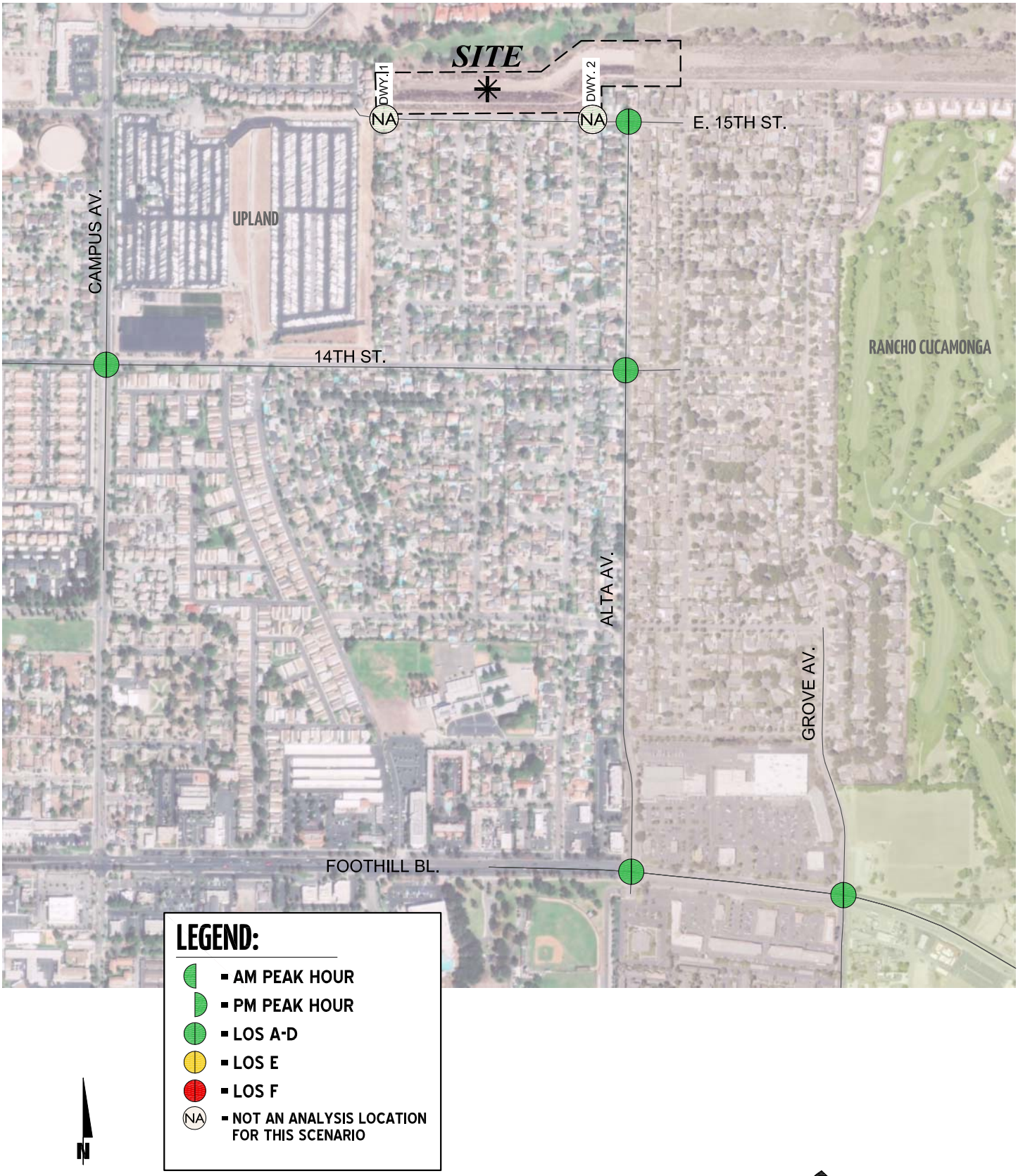

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Table 7-1

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

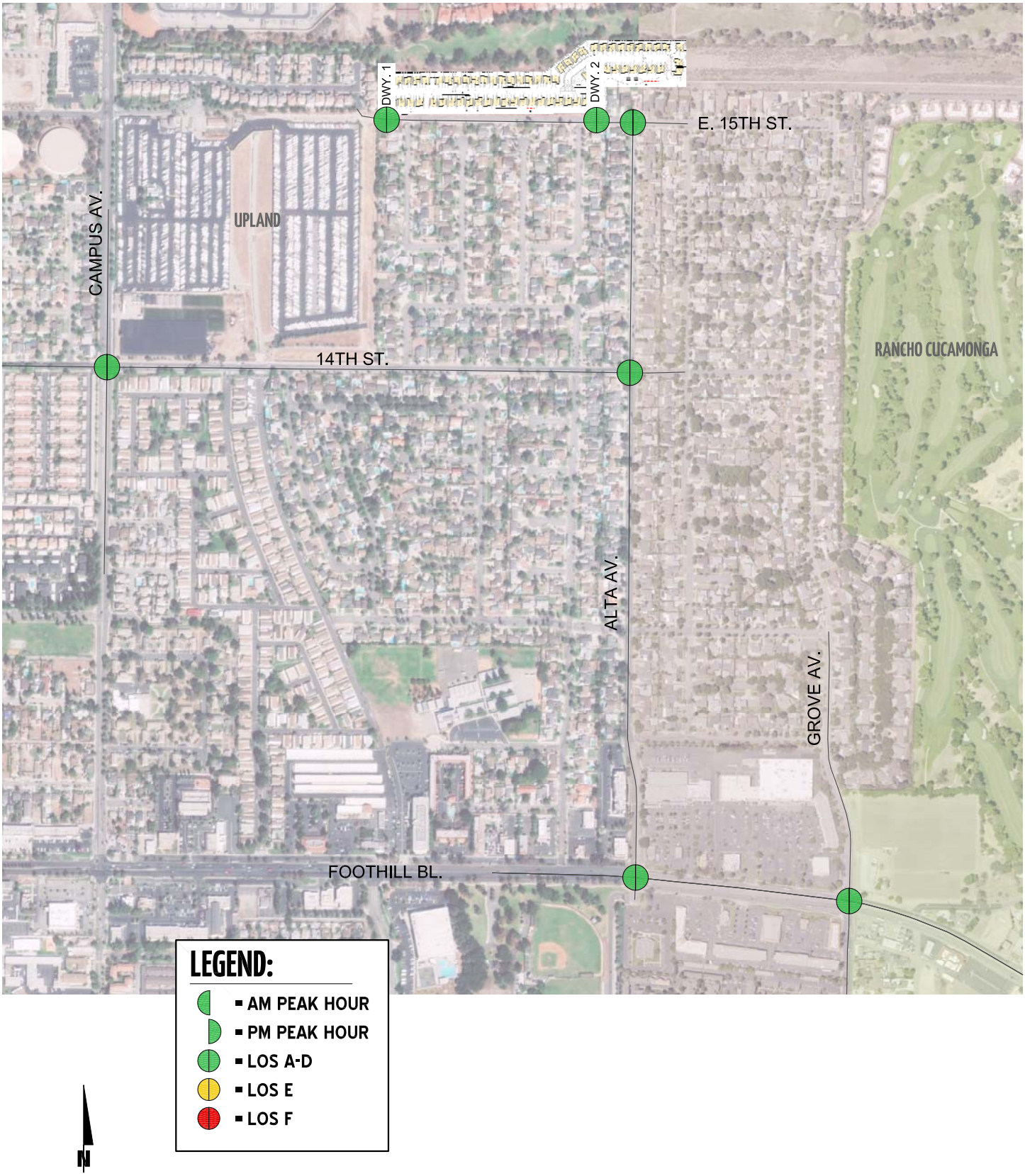

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Table 7-2

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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